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REPORT ON WATER POLLUTION, CONNECTICUT RIVER DRAINAGE BASIN. CONNECTICUT, MASSACHUSETTS, NEW HAMPSHIRE, VERMONT

Public Health Service
Boston, Massachusetts

1951

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REPORT ON WATER POLLUTION

Connecticut River Drainage Basin

CONNECTICUT
MASSACHUSETTS
NEW HAMPSHIRE
VERMONT

prepared by

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
Division of Water Pollution Control
New England Drainage Basin 7

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in cooperation with

CONNECTICUT
State Water Commission
State Department of Health
MASSACHUSETTS
Department of Public Health
NEW HAMPSHIRE
Water Pollution Commission
VERMONT
State Water Conservation Board
NEW ENGLAND
Interstate Water Pollution Control Commission

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Part 1

INTRODUCTION

The Federal Water Pollution Control Act, Public Law 845, passed by the 80th Congress in June 1948, requires the Surgeon General of the Public Health Service to cooperate with other Federal agencies, with State and interstate water pollution control agencies and with municipalities and industries in the preparation or adoption of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof, and improving the sanitary condition of surface and underground waters.

In developing these programs, due regard must be given to improvements necessary to conserve the Nation's waters for public water supplies, propagation of fish and aquatic life, recreational purposes, agricultural, and other legitimate uses.

Recognizing the fact that full technical information was not available to permit the development of such comprehensive programs immediately for most of the Nation's waters, the Public Health Service envisioned the development of a series of reports to cover the interim period prior to the development of comprehensive water pollution control programs. The first of these reports were the Summary Reports which were prepared for the 15 major drainage basins of the country on the basis of information readily available as of July 1, 1950. The second group of reports of this series, of which this is one, are reports on several sub-basins of the country's major drainage basin areas. Since development of comprehensive water pollution control programs is to proceed as rapidly as conditions permit, only a limited number of these interim sub-basin reports are to be completed and the majority of these will be for interstate sub-basin areas. These reports are based on data available as of May 1951 and will provide a reference point for measuring progress; provide a guide to needed additional data; provide a basis for the logical development of comprehensive programs; provide a basis for approval of loans to States, interstate agencies and municipalities at such time as the Congress makes available funds for this purpose; and serve to inform the public on the water pollution control problem and needs for the sub-basin concerned.

The data on which this sub-basin report is based have been compiled through and in cooperation with the State and interstate water pollution control agencies, but should not be considered a detailed engineering investigation of the Connecticut River Basin. Through these cooperating agencies additional data have been obtained from other State officials, county and city officials and representatives of industry. Federal agencies also have been of great assistance.

The sub-basin reports present information about the ways the water resources of the area are used, the pollution entering these water resources and the resulting damages, the benefits which may result from pollution prevention and abatement, pollution prevention measures now in effect, and those which appear to be needed.

Since the sub-basin reports are based on data which are presently available, they do not discuss the present and future best uses of the waters of the sub-basin as such uses are related to pollution control. Such consideration will be included as a part of the comprehensive water pollution programs which will be developed later.

The deficiencies in data and the gaps in information indicated in these sub-basin reports are as significant as the presentation of available facts and statistics. They indicate the work that still needs to be accomplished by water pollution control authorities for the preparation of comprehensive programs.

Data and knowledge now available are sufficient, however, to permit the immediate solution of many of the pollution problems within the Connecticut River Basin without awaiting the results of additional surveys and studies.

A sincere effort has been made by all who contributed to this report to present a fair picture of the complex water pollution problems in the Connecticut River Basin and to present reasonable conclusions and recommendations. It is our hope that this report, as a step in the cooperative development of an ultimate comprehensive water pollution control program, will help in safeguarding the water resources of the Connecticut River Basin.

Part 2

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Special acknowledgment is made of the contributions to this report by the official water pollution control agencies concerned in the Connecticut River Basin. The cooperation extended was excellent and the information and data requested were helpfully and willingly supplied. It is desired to acknowledge in particular the assistance given by the following:

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Part 3

SUMMARY

The watershed of the Connecticut River is the largest in New England and drains an area extending from Canada southward to Long Island Sound. The basin encompasses a part of the States of Vermont, New Hampshire, Massachusetts, Connecticut and the Province of Quebec, Canada. The total drainage area covers 11,320 square miles of which 3,960 are in Vermont, 3,110 in New Hampshire, 2,710 in Massachusetts, 1,425 in Connecticut and 115 in Quebec. The river flows in a generally southerly direction over a watercourse distance of 407 miles before entering Long Island Sound between the towns of Old Lyme and Old Saybrook, Connecticut. The Connecticut is numbered among the major river systems of America and is both an interstate and international river.

The basin is roughly elliptical in shape with the north-south axis being about five times as long as the east-west axis. At the points of maximum distance the basin is about 280 miles long and 62 miles in width. A little less than one-fourth of the area is in cleared farmland, some of which is among the most fertile in New England. About two-thirds of the watershed is wooded with conifers predominating in the north and mixed hardwoods in the south.

The topography of the northern regions is largely mountainous with steep, narrow valleys and high, ragged peaks—the highest in New England. The southern portion is characterized by broad valleys and low, rolling hills interspersed with ponds, lakes, reservoirs and swamps along the coastal plain. The total fall of the river to tidewater at Hartford is 2,190 feet.

The climate is temperate and influenced by successions of alternate high-and-low-pressure atmospheric conditions that produce alternate spells of dry and wet weather. Summer temperatures average from 60° to 68° F. and winter temperature averages vary from 14° to 30° F., the lower temperatures prevailing in the high altitudes of the northern regions. Precipitation in the upper parts of the basin annually averages from 36 to 46 inches, being highest along the mountainous rim. In the lower portions the annual precipitation averages from 40 to 48 inches with the larger amount falling along the coastal area.

About half of all the precipitation can be accounted for as stream flow. The volume of run-off varies considerably with the seasons and is usually highest during the months of March through June. There are 75 stream-gaging stations in operation and from the run-off records it is computed that the average annual discharge at the river's mouth is approximately 19,000 cubic feet per second. Extreme low flows, when they occur, are almost always in August, September and October and sometimes in December and January.

Daily flows are influenced by natural differences in run-off characteristics between areas of the basin and by regulated water storage practices. The rates of reaeration of the streams have not been measured but are known to be high as a result of high stream velocities, rocky bottoms, natural falls, dams and rapid mixing.

Flood areas exist in almost all reaches of the main stem and the principal tributaries. Most of these areas contain highly developed industrial, commercial, agricultural and urban developments where losses from past floods have been considerable. The Federal Government has constructed a number of dikes, floodwalls, dams, storage reservoirs and other local protection works in various parts of the basin and more such flood protection works have been authorized. There is before the various State legislatures, for consideration at this time, an interstate flood control compact designed to further a comprehensive system for the control of floods in the interests of the general welfare of the States in the Connecticut River Valley. It is expected that the necessary legislation for the creation of the compact will be passed by the States and that the Congress will ratify the compact.

Manufacturing dominates the economic structure of the Connecticut Basin and the area includes several of the important manufacturing centers of the United States. The basin has shown a steady industrial growth and in the period 1939 through 1947, the number of manufacturing establishments increased by an estimated 39 percent and the value added to products by manufacture increased by approximately 180 percent. In 1947, the salaries and wages paid all manufacturing employees was an estimated $750,000,000 and the value added to products by manufacture was over $1,200,000,000.

Farming is largely specialized and the leading sources of agricultural income are from the sale of livestock, livestock products, truck garden produce and tobacco. The value of all farm products sold in 1945 is estimated to have been $125,000,000 and of which livestock and livestock products accounted for nearly 75 percent.

Recreation is big business in New England and represents the fastest growing industry in the area. The Connecticut River Basin has excellent resources for recreation and there has been a tremendous investment in summer homes, resorts, hotels and recreational facilities. The greatest share of the recreational industry by far has been developed by private capital and this industry is of particular importance to the economic welfare of Vermont and New Hampshire. No accurate figures are available but it is estimated that the 1951 income of the recreation industry in the Connecticut Basin will approach $100,000,000 and that during this year from two to three times this amount will be expended for improvement of existing facilities and development of new recreational facilities.

Lumbering, quarrying, mining, and commercial fishing are of relatively minor economic importance to the basin but these activities are of importance to local economy where carried out. There has been a growth in the wood products industry in the northern regions and this activity shows promise of further expansion.

The population growth has been steady and in 1950 the population indicated by the preliminary releases of the Seventeenth Census was 1,530,240, which is approximately 14 percent greater than the 1940 figures. The population density of the basin averages 136.6 persons per square mile and in Vermont it is 41.2, in New Hampshire 46.2, in Massachusetts 214.1 and in Connecticut 450.7. There are 39 cities and urban towns within the watershed and their populations account for 61 percent of the total basin population. The farm population is about 10 percent of the total and the remaining 29 percent reside in villages in non-urban towns. Hartford, Connecticut, and Springfield, Massachusetts, are the two largest cities, having respective 1950 populations of 177,073 and 162,601.

The development of the Connecticut Valley has been diverse and the use of the water resources for almost all purposes is widespread. These water uses are for public water supply, industrial water supply, livestock watering, game fishing, recreational bathing, boating and yachting, irrigation, navigation, hydroelectric power development, commercial fishing, shell fish propagation, wildlife habitat and transportation of wastes.

There are 230 communities served by 176 public water supplies. Approximately 1,134,000 persons, or 74 percent of the basin population, are served by these public supplies. Ninety-two of the public supplies originate principally in surface waters and these serve 1,034,000 persons. The use of surface waters supplied by public systems is estimated to average 114,305,000 gallons per day compared to 10,130,000 gallons of ground water consumed from 84 public supplies serving 100,000 persons. In addition, in Massachusetts, the Metropolitan District Commission diverts a large share of its water supply from the Connecticut River watershed and in 1949 this amounted to 37,868 million gallons, a quantity almost equal to the public water supply use of the entire basin.

There is very little quantitative data on industrial water supplies. Many of the larger and more important industries have "wet processes" and water is an important industrial utility. Some manufacturing plants purchase process waters from public supplies but the majority are dependent on streams and, in some instances, on industrial wells. A systematic inventory on water use and requirements by industry needs to be made.

The surface water resources are widely used for recreational purposes of game fishing, bathing, and boating. The recreation industry is expanding rapidly and the demand for more public water recreation facilities is increasing. The construction of flood control reservoirs providing conservation storage and the lifting of certain restrictions on public water supply watersheds and reservoirs would make more recreational waters available. The important position of the recreation industry in the economy of the northern regions of the basin and to the general welfare of all of the area indicates the prominent role played by recreational waters. The importance of the water resources to wildlife is related to recreation. A large fish and animal population is required to accommodate the sports hunting and fishing activities. Some areas cannot support the present demands for recreational hunting and fishing and more such facilities are needed.

Compared to other large river basins in the United States the hydroelectric power potential of the Connecticut is well-developed and, although some plants are obsolete and some sites not fully developed, the installed capacity averages 50 kilowatts per square mile. Sixty-four public utility plants have a total installed capacity of 485,000 kilowatts and 226 industrial plants develop a total of 46,000 kilowatts.

In view of the large contribution of livestock and livestock products to the total agricultural income, an adequate water supply for farm animals is important. In southern Massachusetts and in Connecticut irrigation of crops is practiced and considerably increases the yield and value of farm products. An increase in scientific farming practices may increase the future demands for irrigation waters.

Navigation is increasing in importance as a water use. In 1949, water-borne commerce on the river below Hartford amounted to 1,800,000 tons and it is estimated that a tonnage of 2,000,000 was exceeded in 1950.

Shell fish propagation and commercial fishing are relatively minor water uses but of importance to those engaged in such activities.

There is a widespread use of the water resources for the transportation of sewage and industrial wastes. While this use for the final disposal of all waterborne wastes is indispensable it has become incompatible with other normal and desired uses. Measures are needed to be taken to provide for harmonious accommodations of all desired water uses.

The Connecticut River system is subjected to a large amount of pollution, both organic and inorganic. The main stem, all of the 23 principal tributaries and 14 of the lesser tributaries to the main stem receive pollution. The largest amounts of organic waste pollution result from the discharge of sanitary sewage and wastes from the paper, textile and dairy industries.

The metal processing and machine industries contribute most to inorganic pollution by the discharge of degreasing, pickling, grinding, plating and finishing wastes. A special problem exists in Vermont from the disposal of sawdust and wood chips into streams.

There are 212 separate sources of sewage pollution from municipalities, other legal bodies, institutions, hotels and significant population centers. These sources represent untreated sewage and treatment plant effluents from systems serving a total of more than one million persons. Table A, which follows, summarizes the data on sources of municipal sewage pollution.

TABLE A

SOURCES OF POLLUTION

MUNICIPAL

Municipalities*	Sources of Pollution (In Number of Municipalities*)	Population Served By Sewerage System	Amount of Pollution Discharged to Watercourse (In Terms of Equivalent Number of People)**
Having data on pollution load discharged to watercourse	170[1/]	585,220	399,300[3/]
Having population data available (Data on pollution load to watercourse incomplete or not available)	42[1/]	437,960[2/]	Undetermined
TOTAL	212	1,023,180	xxxxx

See following page for footnotes.

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

1/Separate sources of pollution - some cities and towns have more than one separate source of pollution. Does not include 8 communities served by sewerage systems of 4 other municipalities.

2/Does not include undetermined population served by private sewers in 12 small communities.

3/Includes municipalities without significant industrial wastes where population served is taken as population equivalent of wastes discharged.

Industrial pollution results from a total of 355 separate discharges of wastes to watercourses, 58 being sources of employee sewage pollution only and 297 being sources of manufacturing process wastes pollution. Many of the latter also discharge employee sewage but these are considered as a single source of industrial pollution. Although sources of employee sewage pollution are small compared to process wastes, State water pollution control agencies consider employee sewage significant to the bacterial quality of and pollution load on receiving streams. There are inadequate data available on the strengths and volumes of industrial pollution but the total pollutional load contributed by manufacturing plants is probably more than that of municipal sewage which is equivalent to about 700,000 persons. A summary of industrial pollution follows.

TABLE B

SOURCES OF POLLUTION
INDUSTRIAL*

Industries*	Sources of Pollution (In Number of Plants)	Amount of Pollution Discharged to Watercourse (In Terms of Equivalent Number of People)
Producing Organic Wastes	67 1/	152,660
Producing Organic Wastes	199 2/	Undetermined
Producing Inorganic Wastes	74	Not Applicable
Producing Wastes of Undetermined Type	17	Undetermined
TOTAL	355 3/	xxxxx

See following page for footnotes

* Industries having separate outlets discharging wastes directly to watercourses.

1/Includes 31 plants discharging sanitary sewage only with total population equivalent of 840 persons.
2/Includes 2 plants also producing inorganic wastes and 27 plants having sanitary sewage only from an undetermined number of employees.
3/Total adjusted for duplication noted in 2/.

For the total of 212 separate sources of pollution from 220 municipalities, other legal bodies, institutions and hotels, treatment facilities have been constructed to serve 57 sources while 157 are discharged without treatment. Primary sewage treatment facilities, serving a contributing population of 514,720 persons, are operated by 23 municipalities, four institutions and five resort hotels. Secondary sewage treatment works, serving 147,090 persons, are operated by 12 municipalities, 11 institutions and one airfield. One school in Vermont discharges secondary sewage effluent to ground water and is not considered a source of pollution in this report. The data on this school are included above, however, as credit for satisfactory sewage treatment is due. The sewage from 146 municipalities, three institutions and eight resort hotels, representing a combined population of 361,545 persons, is discharged without treatment. Table C is a summation of the basic data on existing treatment facilities operated by municipalities and other significant population concentrations in the Connecticut River Basin.

TABLE C

EXISTING TREATMENT FACILITIES

MUNICIPAL

Degree of Treatment Provided	Number of Municipalities* Served	Number of Treatment Plants	Population Served
Primary	35 1/ 2/ 3/ 4/	32 4/	514,720
Secondary	25 1/ 5/	24 6/	147,090
No Treatment	157 7/	---	361,545

See following page for footnotes.

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

1/ Two towns each served by two plants, each by one primary and one secondary plant and towns are counted under each category.

2/ Includes 5 resort hotels served by septic tanks.

3/ Includes 4 institutions.

4/ Nine plants serve 12 communities and part of one also served by an additional primary plant is counted twice as a municipality.

5/ Includes 10 institutions and 2 airfields.

6/ One municipal plant serves two communities; one institutional plant serves an additional municipality. Includes one school discharging sewage effluent to ground water and not considered in this report as a source of pollution.

7/ Includes 4 institutions and 8 resort hotels.

Eighteen industrial establishments, having separate outlets discharging process wastes directly to watercourses, have provided treatment or disposal facilities. Two hundred and seventy-four other manufacturing plants discharge process wastes directly to streams without treatment and it has not been determined whether or not five other plants have treatment facilities. There are 58 manufacturing plants that discharge only sanitary sewage and 13 of these establishments have provided facilities for treating employee sewage. Twenty-two plants discharging process wastes have treatment facilities for employee sewage. Table D presents a breakdown of this information by major industry groups.

Of the 56 existing sewage treatment facilities (operated by 35 municipalities, 14 institutions, five hotels and two airfields), 40 are adequate in capacity, 14 are inadequate and the adequacy of two others has not been determined. Forty-eight of the treatment plants are operated satisfactorily, seven are not, and the status of operation at one plant is not known. The sewage from 509,925 persons is satisfactorily treated in 11 primary and 21 secondary treatment plants. Unsatisfactory effluents are discharged to watercourses from combined total of 150,190 persons. Table E shows the adequacy of these treatment facilities with relation to capacity and operation.

Included in Table E are two primary treatment plants with undetermined adequacy of capacity, the status of operation of one also being undetermined.

Tables D and E follow.

TABLE D

EXISTING TREATMENT FACILITIES

INDUSTRIAL*

Type Industry	Number of Plants	Number of Industrial Plants Having: Treatment Facilities	No Treatment Facilities	Undetermined Facilities
Food and kindred products	40	3	36	1
Textile mill products	55	1	54	0
Lumber and lumber products	34	0	34	0
Furniture and fixtures	4	0	4	0
Paper and allied products	60	4	56	0
Chemicals and allied industries	9	3	6	0
Rubber products	2	0	2	0
Leather and leather products	4	1	3	0
Primary metal products	7	1	6	0
Fabricated metal products	33	2	31	0
Machinery (except electrical	9	1	8	0
Miscellaneous	40	2	34	4
Plants discharging sanitary sewage only	58	13	45	0
TOTALS	355	31 1/	319	5

* Industries having separate outlets discharging wastes directly to watercourse.

1/Does not include 22 plants discharging process wastes that have provided treatment facilities for employee sewage.

TABLE E

ADEQUACY OF EXISTING TREATMENT FACILITIES

MUNICIPAL*

Number of Municipal* Treatment Facilities	Adequacy with Relation to:					
	Capacity			Operation		
	Satisf.	Unsatisf.	Undetermined	Satisf.	Unsatisf.	Undetermined
56	40	14	2	48	7	1

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

Thirty-one industrial establishments, having separate outlets discharging directly to watercourses, have provided treatment facilities, 18 for the treatment of process waters and 13 for the treatment of employee sewage. Eight of the industrial waste treatment facilities are satisfactory in capacity, four are unsatisfactory and the adequacy of six has not been determined. Four of the sewage treatment facilities are satisfactory in capacity, six are unsatisfactory and information on the adequacy of three other sewage facilities is not available. The status of existing industrial treatment facilities with relation to capacity and operation is shown in Table F.

TABLE F

ADEQUACY OF EXISTING TREATMENT FACILITIES

INDUSTRIAL*

Number of Industrial* Treatment Facilities	Adequacy with Relation to:					
	Capacity			Operation		
	Satisf.	Unsatisf.	Undetermined	Satisf.	Unsatisf.	Undetermined
31[1/]	12[2/]	10[3/]	9[4/]	21	0	10

See following page for footnotes.

* Industries having separate outlets discharging wastes directly to watercourse.

1/Includes 13 industries having sanitary sewage only.

2/Includes 4 industrial plants with sanitary sewage only.

3/Includes 6 industrial plants with sanitary sewage only.

4/Includes 3 industrial plants with sanitary sewage only.

During the period 1946 through 1950 a total of 14 sewage and industrial waste treatment projects were completed. Seven sewage treatment plants were constructed to serve a connected population of 68,500 persons and seven industrial pollution abatement facilities were placed in operation. The State water pollution control agencies are handicapped in carrying out comprehensive stream pollution control programs by a lack of sufficient personnel and adequate funds for needed surveys, studies, investigations, education of the public and community planning projects. Pollution abatement programs are generally caused to be carried out over extended periods during which time it is difficult to maintain the interest and support of the public and industry. With the exception of Connecticut, none of the States has had adequate legislation in effect to enforce needed pollution abatement until the period following World War II. Now all four of the States in the basin have adequate legislation in effect to enforce needed pollution abatement measures when necessary. Further, they are signatory members of the New England Interstate Water Pollution Control Commission and as such are pledged to the abatement and control of pollution of the interstate inland and tidal waters of the basin. The rising costs of living and of doing business has increased the resistance of communities and industries towards providing necessary pollution abatement measures. State water pollution control authorities require only those measures that are reasonable and equitable, however, and have concluded that these measures can be provided without undue financial hardships.

Table G shows the progress in construction of pollution abatement facilities in the Connecticut River Basin during the period 1946 through 1950.

Many more stream pollution prevention and abatement measures are needed in the Connecticut River Basin. There are gaps in the available information on volumes and strengths of wastes discharged and their effects on receiving watercourses. Studies to determine effective methods of treatment for some industrial wastes are needed as are studies to provide methods for recovery of valuable by-products and to promote greater utilization of raw materials. Effective programs for informing the public and industry in the needs for and benefits from pollution abatement are required as well as programs to promote sound community planning projects to serve the best interests of the majority.

TABLE G

PROGRESS IN CONSTRUCTION OF POLLUTION ABATEMENT FACILITIES

Year	Municipal		Industrial	
	Sewage Treatment Plants Completed	Design Population	Waste Treatment Plants Completed	Amount of Waste Treated (In terms of Equiv. No. People)
1946	-	-	1	250
1947	1	2,000	1	500
1948	-	-	1	Metal plating
1949	5	64,500	1	Undetermined
1950	1	2,000	3	2 - 1,150 1 - Undetermined

Despite the handicaps, and sometimes opposition, confronting the State water pollution control agencies, progress towards the completion of a comprehensive program of pollution control is being made. Almost all of the significant sources of sewage pollution have been located and in the majority of cases the requirements for pollution abatement have been determined. With few exceptions most of the sources of industrial pollution have been located and the needs for pollution abatement determined. As the stream classifications required to be made by law in Vermont and New Hampshire are completed, more pollution abatement needs will be established and remedial measures required.

From the available information on programs currently in progress it has been established that 139 sewage projects will be needed by municipalities, other legal bodies, hotels and institutions and these will serve a total of 489,620 persons. No projects are needed by 46 municipalities and institutions already served by adequate facilities serving 499,130 persons. The needs for treatment measures at 34 other such sources of sewage pollution, contributed to by 34,430 persons, have yet to be determined. Table H lists in summary form the needs for sewage treatment, other than by industry, in the Connecticut River Basin.

TABLE H

WASTE TREATMENT NEEDS - MUNICIPAL*

Needs	Number	Population Served by Facilities
New Plant	121 1/	325,310 2/
Enlargement or Additions to Existing Plant	14 3/	145,710
Replace Existing Plant	4 4/	18,600
No Project Required	46 5/	499,130
Undetermined	34	34,430

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

1/ Includes 2 institutions; 7 resort hotels; 11 connections to other sewerage systems; and individual treatment at private sewers in 19 communities.

2/ Does not include populations of 10 small communities where figures are undetermined.

3/ Includes 4 community, 3 hotel and 1 institutional treatment plants requiring chlorination only; 1 institution and 2 resort hotels requiring additions to existing units.

4/ Includes one resort hotel and one community that is to connect to Hartford Metropolitan District sewers.

5/ Includes 14 institutions.

Current water pollution control programs show a total of 263 projects to be required of industrial plants. Two hundred ten projects are needed to abate pollution by industrial wastes and 53 are needed to abate employee sanitary sewage pollution. No projects are required by 9 plants having adequate industrial waste treatment or disposal facilities, or for four plants having satisfactory sewage treatment plants. The pollution abatement needs for 78 other sources of industrial pollution have not been determined but as stream classifications progress in Vermont and New Hampshire, these requirements will be made known. The needs for abatement of industrial pollution are summarized in Table I and the general type of project to be required is shown.

TABLE I

INDUSTRIAL WASTE POLLUTION ABATEMENT NEEDS

Needs	Number
New Treatment Plant or other Pollution Control Measures	163 1/ 2/
Enlargement or Additions to Existing Plant	14 3/
Replace Existing Plant	0
Connection to Municipal Sewer System	87 4/ 7/
No Project Required	13 5/
Undetermined	78 6/

* Industries having separate outlets discharging wastes directly to watercourse.

1/ Includes 18 projects to remove sawdust piles and some possibly to install conveying machinery.

2/ Includes 35 industries with sanitary sewage only requiring new sewage disposal facilities

3/ Includes 9 industries with sanitary sewage only.

4/ Includes 9 industries with sanitary sewage only.

5/ Includes 4 industries with sanitary sewage only.

6/ Includes 1 industry with sanitary sewage only.

7/ Two plants also require projects for pretreatment of wastes.

Substantial progress is being made by the State water pollution control agencies in requiring action to be taken by municipalities to provide needed treatment measures. Table J shows the current status of action on the pollution abatement needs of municipalities in the Connecticut River Basin.

To comply with the requirements of the water pollution control agencies, action to provide 76 industrial pollution abatement measures is underway. Seventy projects are for the treatment or disposal of process wastes and six are for employee sewage. No action is being taken on 142 needed projects and the status of action on 124 other sources of industrial pollution have not been determined. Table K is a summary of the current status of action by industry to provide needed pollution abatement measures in the Connecticut River Basin.

See following page for Tables J and K

TABLE J

CURRENT STATUS OF MUNICIPAL* ACTION ON POLLUTION ABATEMENT NEEDS

Status of Action	Number of Municipalities*
Inactive	97
Active Planning	47 1/
Final Plans Approved	15
Under Construction	3
Undetermined	12

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

1/Includes 5 municipalities requested by letter to take action and 6 municipalities with approved preliminary plans.

TABLE K

CURRENT STATUS OF INDUSTRIAL* ACTION ON POLLUTION ABATEMENT NEEDS

Status of Action	Number of Industries
Inactive	142 1/
Active Planning	59 2/3/
Final Plans Approved	13
Under Construction	4
Undetermined	124 4/

* Industries having separate outlets discharging wastes directly to watercourse.

1/Includes 4 plants with sanitary sewage only.

2/Includes 6 plants with sanitary sewage only.

3/Includes 24 plants requested by letter to take action.

4/Includes 44 plants with sanitary sewage only.

Despite the limitations imposed on the State water pollution control agencies by inadequate funds and limited staffs, a program of pollution prevention and abatement is progressing in the Connecticut River Basin. Much preliminary work has been accomplished and much more remains to be done before a comprehensive water pollution control program will be in effect. One of the necessary requirements for the development, adoption and execution of a comprehensive program is the attainment of the cooperation and understanding of the public, industry and all agencies interested in and concerned with the water resources. Such persons should be fully informed of the needs for and benefits from pollution abatement through sound programs of education and planning.

Part 4

CONCLUSIONS

It is concluded that:

1. Good progress towards the determination and execution of a comprehensive stream pollution control program for the Connecticut River Basin is being made although there is much that remains to be done.

2. The State water pollution control agencies are seriously handicapped in carrying forward comprehensive pollution control programs by insufficient personnel and funds for surveys, studies, investigations, education of the public and community planning projects. Programs are necessarily carried out over long periods during which benefits become obscure and the programs are generally opposed by the public and industry through lack of understanding of the problems and the needs for and benefits resulting from pollution abatement.

3. Water is one of the most important natural resources of the basin, if not the most important. A widespread use of the water resources for all normal purposes is made. Economically, uses for domestic water supply, industrial water supply, hydroelectric power development and recreation are most important.

4. Almost all of the principal waters of the basin have been damaged by pollution. Damages range in extent from exclusion of use for recreational bathing to creation of nuisance conditions. The most serious conflict between pollution and water use probably lies in damages to industrial and recreational waters. Damages from pollution conflict least with uses for public water supplies since almost all of these are taken from protected sources.

5. The physical characteristics of the basin are such as to provide streams with a large capacity for self-purification and recovery from effects of pollution thereby having a limiting effect on extent of damages transported downstream.

6. Pollution control programs now in progress require a large number of remedial measures to be placed in effect by municipalities, other legal bodies, institutions and hotels. One hundred twenty-two new sewage treatment facilities (including 12 projects to connect to existing sewers and 19 community projects to abate pollution by individual treatment at private outlets), enlargements or additions to 14 existing plants, and replacement of

three inadequate plants are needed. These 139 sewage construction projects are required to satisfactorily treat or dispose of the sewage from a total of 489,600 persons. The requirements for 34 other sources of sewage pollution from 34,400 persons residing in small communities have yet to be determined.

7. A large number of pollution abatement measures are needed to be provided by industry. For the satisfactory treatment of process wastes 188 new treatment plants or connections to municipal sewers are required. Five existing industrial waste treatment plants need additions or enlargements. Eighteen special projects to eliminate sawdust pollution are needed in Vermont. New sewage treatment or disposal facilities are needed by 35 manufacturing plants discharging employee sewage only and nine other such plants require additions to or enlargement of existing facilities. Nine manufacturing plants need connections to municipal sewers for disposal of employee sewage. The project needs for 77 sources of process wastes and one source of employee sewage need to be determined.

8. Of the needed pollution control projects to be required 106 are in an active planning stage; 28 have final plans approved; and seven projects are under construction. Two hundred thirty-nine projects needed to control pollution are in an inactive status and the status of 136 other needed projects has not been determined.

9. In addition to known requirements for pollution abatement projects, surveys and investigations of sources of pollution where abatement requirements have not been determined are needed. Reasonable and equitable methods of treatment of some industrial wastes need to be determined and studies made on recovery of valuable by-products and greater utilization of raw materials. Comprehensive intrastate and interstate water pollution control programs need to be formulated and evaluated to determine if proposed measures will result in water qualities commensurate with future intended uses.

10. All of the communities, institutions and hotels that will be required by the State water pollution control agencies to provide sewage treatment or disposal measures, or improve existing facilities, can do so now without undue financial hardship and the methods by which municipal projects may be financed are adequate.

11. With few exceptions, the industries that have been requested by the State water pollution control agencies to take corrective action to abate pollution can do so now by available methods that are reasonable and equitable.

12. All of the State water pollution control agencies concerned in the Connecticut River Basin have been provided with legislation that has been adequate to date to enforce needed pollution control measures.

13. All of the States in the Connecticut River Basin are members of the New England Interstate Water Pollution Control Commission and as such are pledged to provide abatement of existing pollution and to control future pollution of interstate waters in the basin.

14. The Connecticut River is an interstate stream flowing by or through the States of Vermont, New Hampshire, Massachusetts, and Connecticut and the quality of waters at each of the State lines in common with the river is effected by upstream pollution.

15. There are at least 10 significant benefits to be obtained from a comprehensive program of pollution prevention and abatement in the Connecticut River Basin and the realization of these benefits will depend in considerable measure on the cooperation, understanding and willingness to proceed by all persons, groups, industries, authorities and agencies sincerely interested in the optimum development of the basin's water resources and the future welfare and well-being of the region.

Part 5

RECOMMENDATIONS

From a study and consideration of all the available data and plans in progress that have served as a basis for this baseline report on water pollution control in the Connecticut River Basin, it is recommended that:

1. Immediate progress in the submission of plans and the construction of sewage treatment works be required of those municipalities where no further studies are required.
2. Immediate progress in the submission of plans and the construction of remedial works be required of those industries where no further studies are required and where reasonable and equitable methods of waste treatment are available.
3. As a phase of the comprehensive pollution abatement program that can be accomplished now, immediate steps be taken to eliminate domestic sewage pollution from private sewers, septic tanks or other outlets except in communities where municipal sewerage and sewage treatment works are to be required and for these latter studies be initiated.
4. As a phase of the comprehensive pollution abatement program that can be accomplished now, immediate steps be taken to eliminate sewage pollution from manufacturing plants except where studies of combined treatment of employee sewage and process wastes are indicated.
5. Sufficient funds be made available to the State water pollution control agencies by their respective State governments to: increase technical staffs in an amount to accelerate pollution abatement programs; for conducting needed studies, investigations and surveys; for developing and carrying out a sound program of education of the public and industry in the needs for and benefits from pollution prevention and abatement; and for the promotion of community planning towards the desired objectives of a comprehensive pollution prevention and abatement program.
6. Studies and investigations of sufficient scope be made to determine if planned primary treatment of combined sewage and industrial wastes in municipal works will result in a downstream water quality commensurate with the intended future uses; where it is

indicated that more than primary treatment will be required at a later date, the relative costs of each degree of treatment be determined and the municipalities be required to provide now the method, or methods, of treatment most economically justifiable to accomplish the desired results.

7. Studies and investigations be made of the best available method, or methods, of treatment of all the various industrial wastes represented in the basin so this information can be made a matter of record for use at hearings, in the enforcement of abatement orders and in court proceedings when appeals are made.

8. As an aid to the future economic development and security of the basin, the program of pollution abatement be planned so that water resources at the available and desirable industrial, recreational and residential sites will be of a quality most attractive to new investments in manufacturing, recreation and residential development.

9. All State, local, industrial and private agencies, groups or persons who are concerned with and will benefit from conservation of the water resources of the Connecticut River Basin cooperate sincerely with the official water pollution control agencies in planning and executing a comprehensive water pollution prevention and abatement program so that the best interests of all will be served and the maximum benefits possible derived therefrom.

Part 6

HISTORICAL BACKGROUND

The Indians called the river by a name meaning "long estuary" and added an ending which meant "at." It was their custom to give place-names and to them the river was the place at the long river. The English found the name hard to pronounce and in so doing corrupted it. There are many spellings of the name to be found in old writings, but it was usually Quinatucquet or Quenticutt. How it eventually arrived at its present accepted spelling of Connecticut is not known.

The first white man known to set eyes upon the Connecticut River and to record the event was Adriaen Block, the adventurous and intrepid Dutch explorer. In the spring of 1614, Block, during his explorations of the coasts of Long Island Sound, sailed his new ship, the Restless, as far up the Connecticut River as what is now known as the Enfield Rapids. Block was much impressed by all he saw and named his discovery "De Versche Riviere"--the Freshwater River.

On returning to Holland, Block reported his findings, which included other rivers and territories along Long Island Sound, to the Amsterdam Trading Company. His enthusiastic report resulted in the granting of charters to several trading companies by Holland. At this time it was trade and not settlement of the territory that the Dutch desired and for fifteen years trade with the Indians flourished.

Some time after the establishment of the colony at Plymouth, Massachusetts, the English settlers were visited by the Dutch traders. On one occasion the Dutch invited the English to share in the bountiful trade in the Connecticut Valley, evidently certain that there was a plentiful of trade for both nations. They were doubtless moved by the sore plight and hardships of these people in their settlement on a barren and rock-bound coast. The English, however, were aware of the explorations of Captain John Smith along the New England coast at the same time as Block was sailing along the shores of Long Island Sound. The Plymouth settlers, being good Englishmen, believed that all of the area lying westward of the New England coast was properly the territory of the Crown of England. Indeed, it is true that while the Dutch mapmakers were lettering "New Netherland" across the charts of Captain Block, the English were lettering "New England" across Captain Smith's charts of the same territory. Therefore, the kind invitation by the Dutch to share their trade in the Connecticut Valley was bluntly declined by the English with a warning for the Dutch not to trespass on New England property.

It was several years after the cordial Dutch invitation was declined (and it doubtless was withdrawn after the rebuff) before the English took steps to reap the fruits of the Connecticut Valley which they held to be their own patent right. During this interim the Mohegan Indians had been driven from their homes by the warlike Pequots and sought to entice the English at Plymouth and Boston to settle in the valley. For help in the return of their homes, and protection against the Pequots, the Mohegans offered to subsidize the settlements. The offer was not immediately accepted but in the same year, Edward Winslow of Plymouth, a passenger on the original crossing of the Mayflower, sailed up the river and was much taken by all he observed. It was only after Winslow's trip that English trading ships began to frequent the Connecticut River.

The Dutch continued to exploit only the trade in the valley, and it was the English who established the first permanent white settlements. A company of settlers from Plymouth Colony, having purchased land from the tribes deposed by the Pequots, sailed up the river to what is now Windsor, Connecticut, and on September 22, 1633, nineteen years after the river's discovery, the first permanent white settlement was made.

The first few months of the new settlement were filled with some hardship but the Indians were both friendly and helpful. The pioneers found Nature to be most bountiful as there were countless edible berries and roots, the forests abounded in wild game and the river was literally alive with shad and salmon. The settlers looked forward to bumper crops of maize and vegetables from the fertile fields. After the lean and hardship-filled days at Plymouth it must have seemed that the valley was one huge cornucopia.

By 1636 three more English settlements had been established along the Connecticut and the original settlement at Windsor had been joined by a group from Dorchester, Massachusetts. Wethersfield, Connecticut, was settled by a congregation migrating overland from Watertown, Massachusetts. Springfield, Massachusetts, then called Agawam, was settled by a group from Roxbury and, in 1636, Hartford, Connecticut, was established by a congregation from Newton (later Cambridge), Massachusetts, under the leadership of Thomas Hooker. Under the latter's theocratic philosophy and leadership the early settlements thrived.

The complete settlement of the Connecticut River Basin required many years, during which there were periods of much hardship, political disputes, Indian uprisings and conflict over possession of the territory by the English from the Indians, Dutch and French. It was not until 1724 that the first permanent English settlement was made in Vermont at Fort Dummer (now Brattleboro) and in 1732 the first settlement was established permanently in New Hampshire at Winchester. During the next fifty years the migration continued northward and by the outbreak of the Revolutionary War, the occupancy of the basin was nearly accomplished. It had taken nearly 160 years from the time of the river's discovery by Block.

Throughout the Connecticut River Basin's history the river has played a most important role. It served the original settlers first as a means of transportation and communication and as a source of food and water supply. Later as the transition from an agrarian to an industrial economy took place the tremendous power potentiality of the river was harnessed. With the growth of industry there was a large increase in population and large centers of manufacturing and population developed. Many of the industries were dependent on the rivers for water supply and water rights were desperately sought and jealously guarded when attained. The rivers were called upon to transport away from the cities and villages large volumes of industrial wastes and sewage. In later years, as more leisure time became available to the people, the water resources have been utilized for recreational purposes.

From the time of the entrance of the first Indian into the valley, the river has served mankind. Great progress has been made and the basin represents a cross-section of all the good things that are America. As elsewhere, much of the progress was attained at the expense of Nature and the natural resources of the basin have been so abused they can no longer serve in fullest capacity. The Connecticut is truly one of the great rivers of America and, when the residents of its valleys rediscover their heritage, the Connecticut will surely be returned to its full powers of supporting and sustaining human welfare.

Part 7

PHYSICAL DESCRIPTION

Geography

The Connecticut River originates in the Fourth Connecticut Lake, formed in northern New Hampshire by a beaver dam. Its watershed is the largest in New England, draining an area extending from Canada southward to Long Island Sound, covering parts of four States and the Province of Quebec, Canada. The total basin comprises an area of 11,320 square miles of which 3,960 are in Vermont, 3,110 in New Hampshire, 2,710 in Massachusetts, 1,425 in Connecticut and 115 in Quebec. From the Fourth Connecticut Lake the river flows in a generally southerly direction over a watercourse distance of 407 miles before entering Long Island Sound between Old Lyme and Old Saybrook, Connecticut. The Connecticut is numbered among the major river systems of America.

The basin is roughly elliptical in shape with its major axis being nearly five times as long as its minor axis. Between the points of maximum distance the basin is about 280 miles long with a maximum breadth in Massachusetts of nearly 62 miles. The valley widens in northern New Hampshire and Vermont, narrows again in the central portions of these States and then again broadens into a wide, fertile valley that extends across Massachusetts and into Connecticut until the coastal plain is reached about 15 miles above the river's mouth.

Slightly less than one-fourth of the basin is in cleared farmland, a large proportion being among the most fertile in New England. Pasture lands predominate in the northern regions. Nearly two percent of the land area is occupied by residential and industrial developments and an additional two percent is covered by lakes, ponds and reservoirs. Approximately six percent of the area is occupied by roads and watercourses. The remainder is largely wooded with conifers predominating in the north and mixed hardwoods in the south. Very little of the timber is virgin growth.

The Connecticut River Basin provides an excellent cross-section of the physical features of New England. A general map of the basin is given in figure 1.

Topography

The Connecticut River rises in the high and irregular regions of northern New Hampshire and flows wouthward between the rugged ridges of the White Mountains to the east and the Green Mountains to the west. In Massachusetts the valley broadens and is bounded on the west by the Berkshire Hills and in the east by rolling hills. As the river enters Connecticut the valley narrows and is defined on the west by the Litchfield Hills and by low hills to the east. In central Connecticut the basin narrows rather sharply and the river flows through a narrow valley in irregular country out across the fairly level, swampy coastal plain.

In the northern regions the topography is characterized by mountainous country with steep narrow valleys and high, ragged peaks, the highest in New England. The summit of Mt. Washington is the highest elevation in New England and rises to 6,288 feet above mean sea level. The southern portions of the basin are characterized by broad, fertile valleys and low-rolling hills. Throughout the watershed the hills are interspersed with numerous ponds, lakes and reservoirs and the southernmost portions by swamps. The total fall throughout the river's 407 miles is 2,190 feet and from the First Connecticut Lake to tidewater at Hartford it is 1,643 feet.

Geology

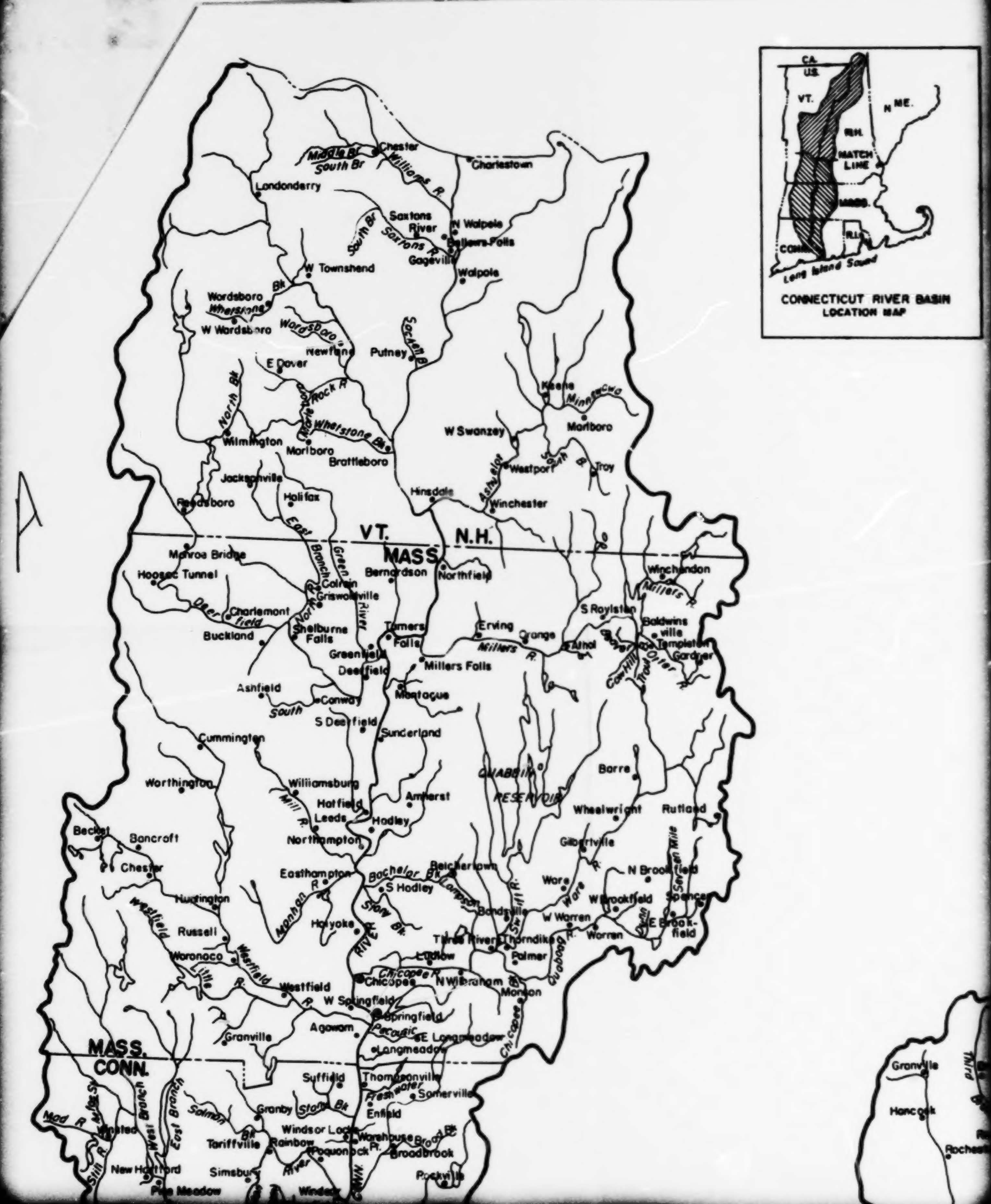
The Green and White Mountains are mature and were formed during a distant physiographic age. By their rounded summits and relatively even skyline, it is obvious that these mountains have been peneplaned a number of times. The Berkshire-Litchfield Hills are a part of the Green Mountain Range which is in turn a part of the Appalachian Range.

Both the White and Green Mountains are composed of highly metamorphosed rocks of considerable variety, including schists, gneisses, quartzites, slates, limestones, etc. These rocks have been intruded by acid igneous bodies of which granite predominates as the principal rock formation. The inner rim of the basin in Connecticut and Massachusetts is characterized by the geology of the low hills, which is largely sandstone and shale with frequent thrusts of traprock.

Underlying the river valleys throughout most of the basin, highly metamorphosed rocks and some igneous bodies are found. In these areas limestone is the principal rock formation. Throughout the broad central valleys the underlying rocks are covered by an overburden of fertile, sandy loam. Finally, scattered throughout the basin, there are glacial and more recent deposits of clays, sands and gravels.

Climate

The basin lies within an area influenced slimatically by cold, dry air masses from the polar regions to the northwest and by moist, tropical marine air from the south. The move-


CA.
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Long Island Sound
CONNECTICUT RIVER BASIN LOCATION MAP
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Charlestown
Londonderry
Saxtons River
N Walpole
Bellows Falls
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Troy
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Halifax
Hinsdale
Winchester
Readsboro
East Branch
VT.
N.H.
MASS
Monroe Bridge
Green
Bernardson
Northfield
Winchendon
Hoosac Tunnel
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Turners Falls
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Orange
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Baldwinsville
Templeton
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Rainbow
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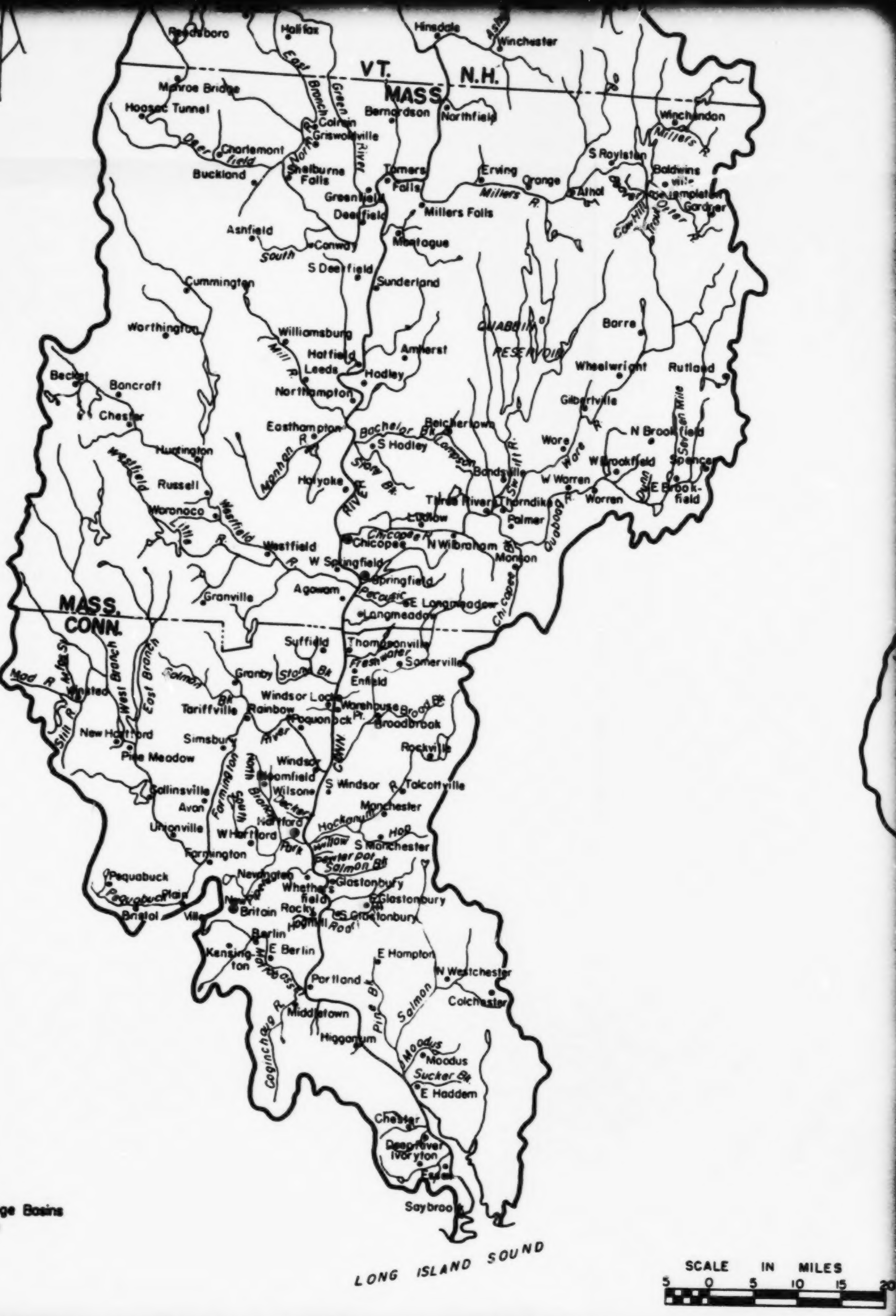
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Park
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Farmington
Pewter Pot
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Pequabuck
Plainville
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S Glastonbury
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Mattabesset
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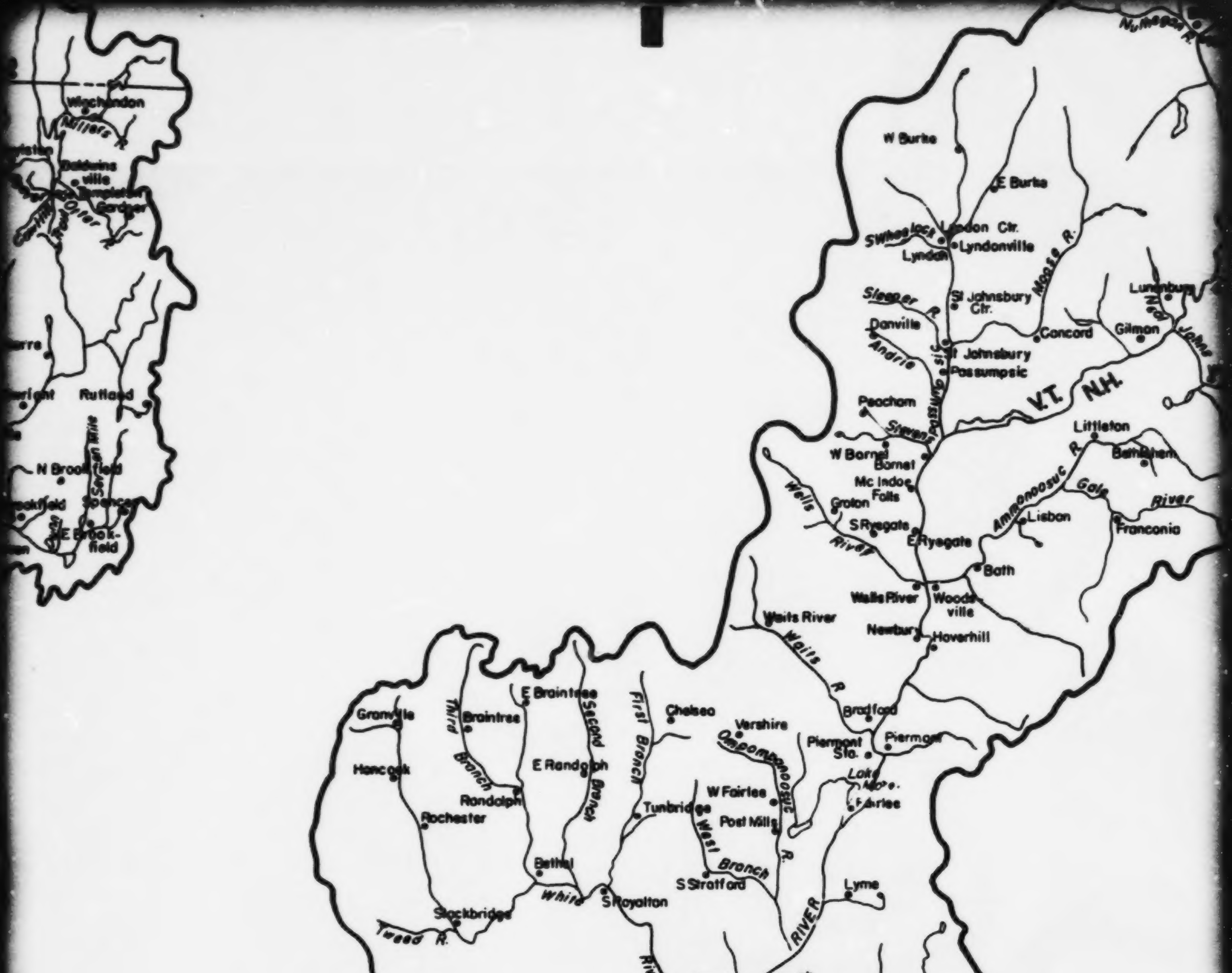
New England Drainage Basins
Boston, Massachusetts
MAY, 1951

B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S Stratford
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Stockbridge
Tweed R.
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RIVER
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Girl Bk
Hanover
Wilder
Mink Bk
Quechee
Hartford
Canaan
White River Jct
W Lebanon
Enfield
Mascoma River
Lebanon
W Woodstock
Woodstock
Bridgewater
Ottauquechee
Plymouth
Broad Bk
Meriden
Lulls Bk
Hartland
Bashin
Brownsville
Windsor
Mill River
Branch
Croydon
Croydon Branch
Red Water
Healdville
Ludlow
Smithville
Cavendish
Proctersville
Black
CONN.
Claremont
Ledge Pond
Sunapee
Sugar River
Newport
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South Branch
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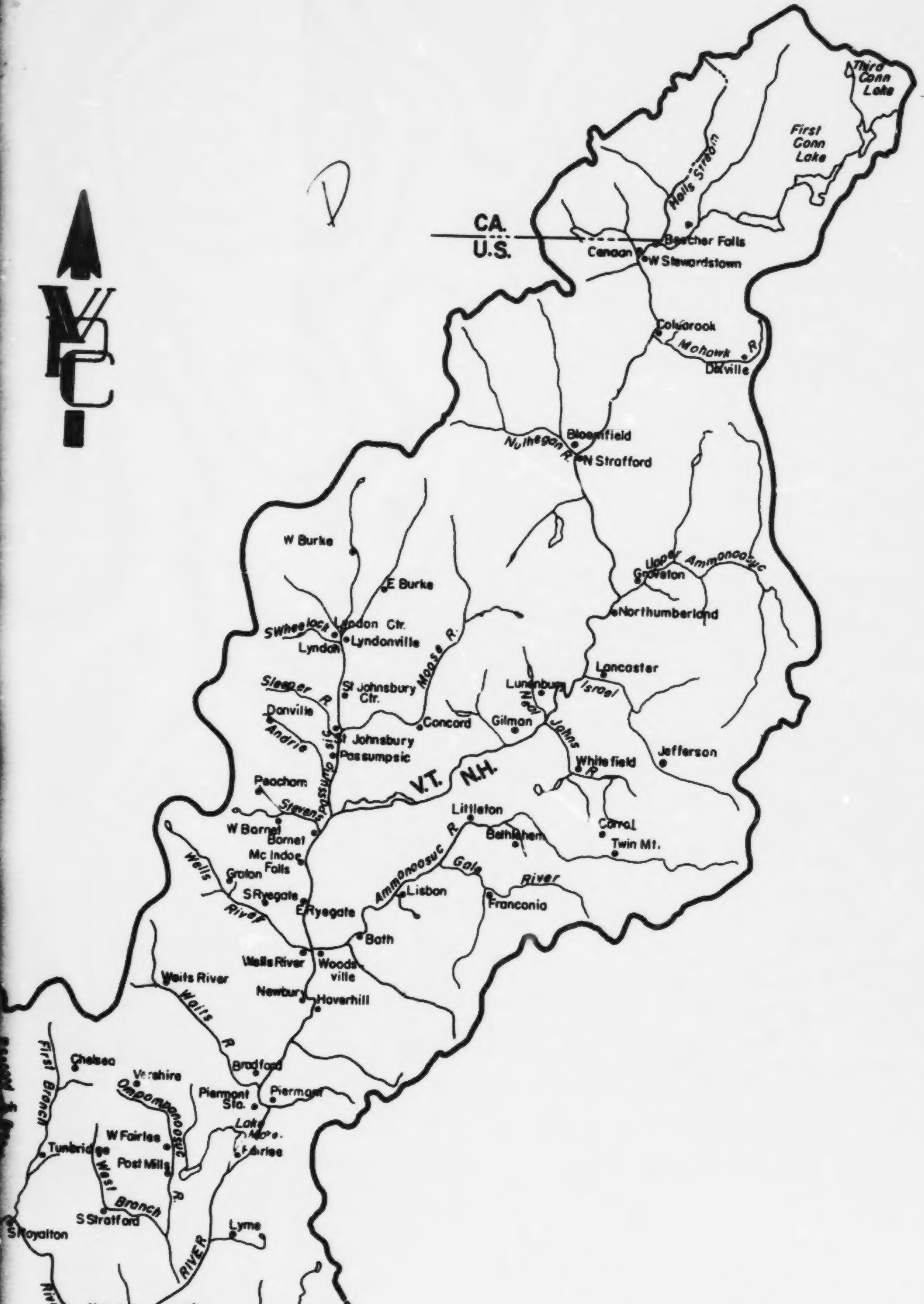
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Canaan
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Colebrook
Mohawk R
Dixville
Bloomfield
Nulhegan R.
N Stratford
W Burke
E Burke
Upper Ammonoosuc
Groveton
Northumberland
S Wheelock
Lyndon Ctr.
Lyndonville
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Moose R.
Sleeper R
St Johnsbury Ctr.
Lancaster
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Neal
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St Johnsbury
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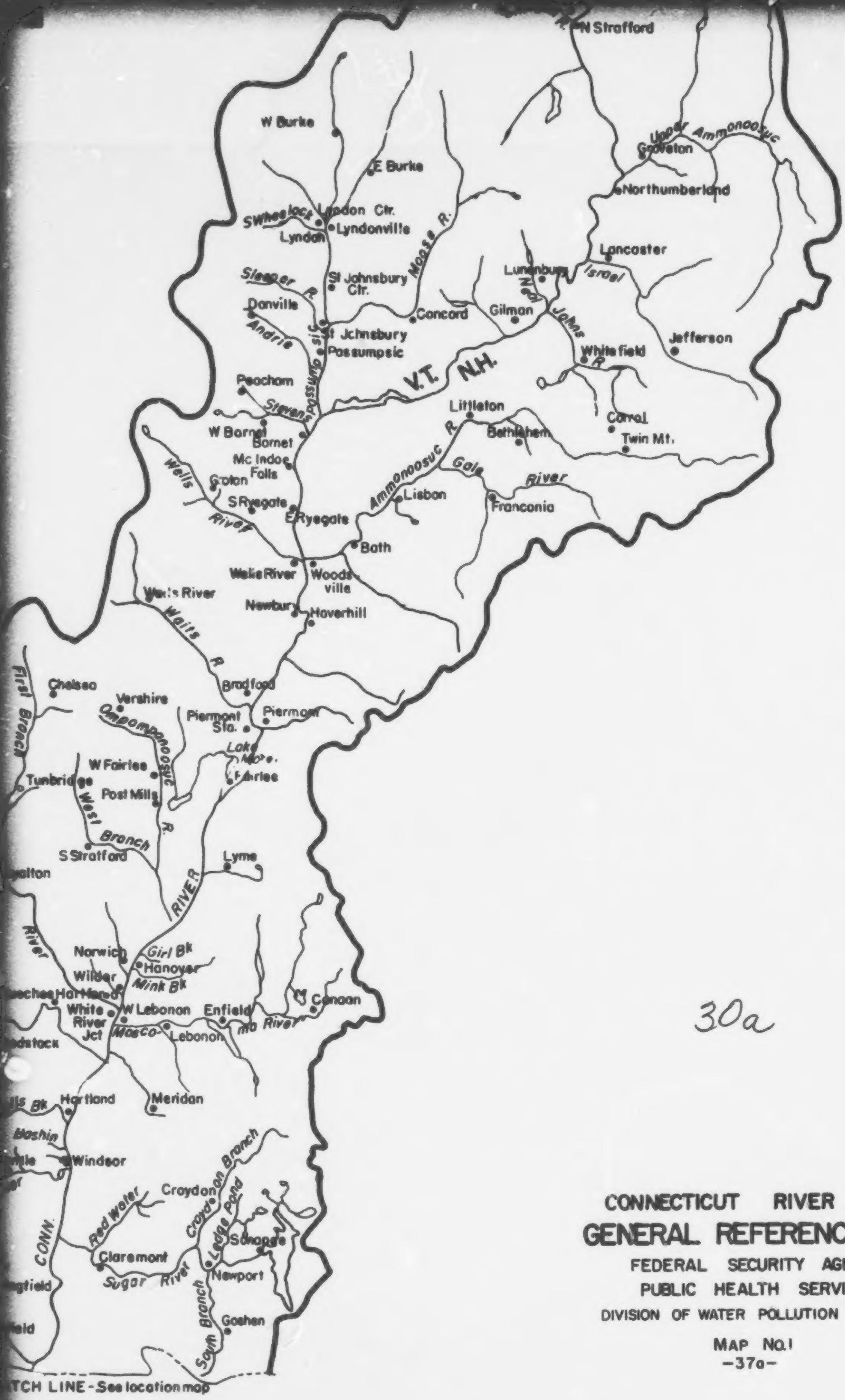
Concord
Gilman
Johns
Jefferson
Whitefield
R
V.T.
N.H.
Peacham
Stevens
W Barnet
Barnet
Mc Indoe Falls
Littleton
Bethlehem
Carroll
Twin Mt.
Wells River
Groton
S Ryegate
E Ryegate
Ammonoosuc R.
Lisbon
Gale River
Franconia
Bath
Wells River
Woodsville
Waits River
Waits R.
Newbury
Haverhill
First Branch
Chelsea
Vershire
Ompompanoosuc R.
Bradford
Piermont Sta.
Piermont
Lake Morey
W Fairlee
Fairlee
Tunbridge
Post Mills
West Branch
S Stratford
S Royalton
Lyme
RIVER
River
Norwich
Girl Bk
Hanover
Wilder
Mink Bk


N Strafford
W Burke
E Burke
Upper Ammonoosuc
Groveton
Northumberland
S Wheelock
Lyndon Ctr.
Lyndon
Lyndonville
Moose R.
Lancaster
Sleeper R.
St Johnsbury Ctr.
Lunenburg
Israel
Neal
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Hartland
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Bashin
Windsor
tle
Croydon Branch
Croydon
Red Water
Ledge Pond
Sunapee
CONN.
Claremont
Sugar River
Newport
ngfield
South Branch
Goshen
ield
TCH LINE - See location map

E

30a

CONNECTICUT RIVER BASIN

GENERAL REFERENCE MAP

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL

MAP No.1
-37a-

ments of these air masses over the basin result in a succession of alternate low-pressure and high-pressure conditions. The former disturbances are generally accompanied by snow or rain and the latter by cold, dry weather.

The climate is temperate although the regions of high altitude in the northern portions are subject to periods of prolonged low temperature in winter and cool temperatures in summer. Summer temperatures in the basin average from 60° to 68° F. and winter temperatures average from 14° to 30° F., the lower temperatures prevailing in the northern regions. Winters are seldom severe in the southern regions and the summers are generally cool and pleasant.

The annual precipitation varies considerably between different parts of the basin. In the upper parts of the basin it averages between 36 to 46 inches being highest along the mountainous rim of the basin. The heaviest precipitation occurs during the summer months and snow accounts for about 25 percent of the total. In Connecticut and Massachusetts the annual precipitation varies between 40 and 48 inches with the larger amounts falling along the coastal area. Less than 10 percent of the total precipitation occurs as snow.

Hydrology

From the Enfield Dam to Long Island Sound, a distance of some 60 miles, the Connecticut River is a tidal estuary. At present commercial navigation is confined to the tidal section of the river and the head of possible commercial navigation is at Holyoke, Massachusetts, 86 miles above the river's mouth.

The Connecticut River system contains 23 principal tributaries of which 10 are in Vermont, six in New Hampshire, 2 in Massachusetts and one in Connecticut. The remaining four are interstate streams. Pertinent data on the principal tributaries are given in Table 1.

All those portions of the basin lying more than 15 miles from the main stem of the Connecticut are drained by some one of these principal tributaries.

About half of all precipitation occuring in the basin appears as stream flow. The volume of run-off varies with the seasons and is generally highest during the months of March through June. Low flows almost always occur in August, September and October and sometimes in December and January. Although rainfall is less, run-off per square mile is highest in the northern regions, being near 1.80 second foot in contrast to 1.60 second foot in the southern regions. The average annual run-off at the mouth of the river is 1.68 second foot per square mile.

Table 1--Principal Tributaries to the Connecticut River

Tributary	State	Length (Miles)	Point of Entry (Miles Above Mouth)	Drainage Area (Square Mile)
Nulhegan	Vt.	15	345	151
Upper Ammonoosuc	N.H.	35	325	260
Israel	N.H.	15	312	130
Passumpsic	Vt.	40	279	507
Ammonoosuc	N.H.	45	266	402
Wells	Vt.	20	266	99
Waits	Vt.	20	247	156
Ompompanoosuc	Vt.	20	224	136
White	Vt.	50	215	710
Mascoma	N.H.	30	214	195
Ottauquechee	Vt.	30	210	223
Sugar	N.H.	30	195	274
Black	Vt.	40	183	202
Williams	Vt.	20	176	117
West	Vt.	45	149	423
Ashuelot	N.H.	45	140	420
Millers	N.H.-Mass.	40	126	393
Deerfield	Vt.-Mass	70	119	665
Chicopee	Mass.	45	80	724
Westfield	Mass.	60	75	520
Scantic	Mass.-Conn.	25	60	113
Farmington	Mass.-Conn.	75	57	613
Salmon	Conn.	25	18	152

There are 75 stream-gaging stations in the Connecticut River Basin maintained cooperatively by the States and the United States Geological Survey, Department of the Interior. Ten of the gaging stations are on the main stem and the others are distributed among the tributaries. The average annual rate of discharge at the mouth of the river over the years of record is approximately 19,000 cubic feet per second and the annual loss of precipitation from transpiration and evaporation is slightly greater.

Variations in daily flows between gaging stations are due to natural differences in run-off characteristics between different areas and to regulated water storage practices. The Connecticut River system is large and the main stem is seldom subject to prolonged periods of low flow. When low flows do occur the monthly run-off is seldom less than 25 percent of the average annual run-off. The tributaries are occasionally subject to periods of low run-off that persist for 30 days or more. During periods of low flow, there is practically no daily discharge at some gaging stations due to water storage practices.

Table 2, below, lists the pertinent stream gaging data for the Connecticut River Basin over the years of record.

Table 2—Stream Gaging Data, Connecticut River Basin 1/

Stream	Gaging Station	Continuous Record From Year	Daily Discharge—Cubic Feet Per Second		
			Mean Flow	Minimum Flow	Exceeded 95% of Time
Connecticut R.	Pittsburg, N. H.	1917	199	2.8	7.5
Connecticut R.	N. Stratford, N.H.	1930	1578	112	263
Connecticut R.	Dalton, N.H.	1927	2902	80	345
Connecticut R.	S. Newbury, Vt.	1918	4983	198	915
Connecticut R.	White River Jct., Vt.	1911	7217	534	1404
Connecticut R.	N. Walpole, N.H.	1942	—	195	1810
Connecticut R.	Vernon, Vt.	1944	—	99	1460
Connecticut R.	Turners Falls, Mass.	1915	11,730	112	1432.6
Connecticut R.	Montague City, Mass.	1904	13,670	325	2350
Connecticut R.	Thompsonville, Conn.	1928	16,020	1060	3091.5

Table 2—Stream Gaging Data, Connecticut River Basin 1/ (Continued)

Stream	Gaging Station	Continuous Record From Year	Daily Discharge—Cubic Feet Per Second		
			Mean Flow	Minimum Flow	Exceeded 95% of Time
Upper Ammonoosuc R.	Groveton, N.H.	1940	—	35	75
Passumpsic R.	Passumpsic, Vt.	1928	727	40	127
Moose R.	St. Johnsbury, Vt.	1928	220	—	21
Ammonoosuc R.	Bethlehem Jct. N.H.	1939	—	—	39
Ammonoosuc R.	Bath, N.H.	1935	663	48	98
Wells R.	Wells River, Vt.	1940	—	14	29
South Branch Waits R.	Bradford, Vt.	1939	64.9	—	9.4
Ompompanoosuc R.	Union Village, Vt.	1940	—	—	28
White R.	Bethel, Vt.	1931	490	—	62
White R.	West Hartford, Vt.	1915	1175	64	148
Ayers Brk.	Randolph, Vt.	1939	47.3	—	4.8
Mascoma R.	West Canaan, N.H.	1939	116	—	14
Mascoma R.	Mascoma, N.H.	1923	213	2.0	71
Ottauquechee R.	North Hartland, Vt.	1930	392	—	48
Sugar R.	W. Claremont, N.H.	1928	383	30	60.3
Black R.	N. Springfield, Vt.	1929	274	10	34
Williams R.	Brockway Mills, Vt.	1940	—	—	12.5
Saxtons R.	Saxtons River, Vt.	1940	—	4.8	9.2
Cold R.	Drewsville, N.H.	1940	—	—	8.8
West R.	Jamaica, Vt.	1946	—	—	—
West R.	Newfane, Vt.	1919 2/	601	—	49

Table 2—Stream Gaging Data, Connecticut River Basin 1/
(Continued)

Stream	Gaging Station	Continuous Record From Year	Daily Discharge—Cubic Feet Per Second		
			Mean Flow	Minimum Flow	Exceeded 95% of Time
Ashuelot R.	Gilsum, N.H.	1922	123	—	10
Ashuelot R.	Keene, N.H.	1945	—	7.3	—
Ashuelot R.	Hinsdale, N.H.	1907 3/	646	12	83
Otter Brk.	Keene, N.H.	1923	69.9	1.9	6.2
South Branch Ashuelot R.	Marlboro, N.H.	1920	58.5	0.4	3.1
Millers R.	Winchendon, Mass.	1916	140	—	16.6
Millers R.	S. Royalston, Mass.	1939	294	16	37.4
Millers R.	Erving, Mass.	1914	623	8	84.5
Sip Pond Brk.	Winchendon, Mass.	1916	29.6	—	2.5
Priest Brk.	Winchendon, Mass.	1916	326	—	1.9
East Branch Tully R.	Athol, Mass.	1916	83.3	—	4.5
Moss Brk.	Wendell Depot, Mass.	1916	21.2	—	1.6
Deerfield R.	Charlemont, Mass.	1913	884	5.0	130
Deerfield R.	W. Deerfield, Mass.	1940	1233	46	165
North R.	Shattuckville, Mass.	1939	170	5.1	13.3
Mill R.	Northampton, Mass.	1938	90.4	5.5	12.2
Ware R.	Barre, Mass.	1946	—	—	—
Ware R.	Cold Brook, Mass.	1928	163	5.0	17.4
Ware R.	Gibbs Crossing, Mass.	1912	317	6.0	33.8
Chicopee R.	Indian Orchard, Mass.	1928	1061	95	117

Table 2.—Stream Gaging Data, Connecticut River Basin 1/
(Continued)

Stream	Gaging Station	Continuous Record From Year	Daily Discharge—Cubic Feet Per Second		
			Mean Flow	Minimum Flow	Exceeded 95% of Time
Swift R.	West Ware, Mass.	1910	301	15	56.4
East Branch Swift R.	Hardwick, Mass.	1937	68.6	—	4.4
Quaboag R.	W. Brimfield, Mass.	1909	237	7.8	34.7
Mill R.	Springfield, Mass.	1938	41.3	—	2.0
Westfield R.	W Chesterfield, Mass	1946	—	4.8	—
Westfield R.	Knightville, Mass.	1909	318	4.0	24.2
Westfield R.	Westfield, Mass.	1914	923	—	144.1
Sykes Brk.	Knightville, Mass.	1945	—	—	—
Middle Branch Westfield R.	Goss Heights, Mass.	1910	103	—	5.3
West Branch Westfield R.	Huntington, Mass.	1935	184	—	14
Westfield Little R.	Westfield, Mass.	1905	88.3	—	—
Scantic R.	Broad Brook Conn.	1928	135	16	32
Farmington R.	New Boston, Mass.	1913	180	5.7	32.2
Farmington R.	Riverton, Conn.	1929	383	23	64
Farmington R.	Rainbow, Conn.	1928	933	5.1	26
Burlington Brk.	Burlington, Conn.	1931	7.77	0.64	1.18
Pequabuck R.	Forestville, Conn.	1941	76.4	7.0	15
South Branch Park R.	Hartford, Conn.	1936	68.8	9.4	18
Park R.	Hartford, Conn.	1936	114	11	22.8

Table 2—Stream Gaging Data, Connecticut River Basin 1/
(Continued)

Stream	Gaging Station	Continuous Record From Year	Daily Discharge—Cubic Feet Per Second		
			Mean Flow	Minimum Flow	Exceeded 95% of Time
Hockanum R.	E. Hartford, Conn.	1919	109	4	22.8
Salmon R.	E. Hampton, Conn.	1928	175	1.0	14.3
East Branch Eightmile R.	N. Lyme, Conn.	1937	42.7	0.03	1.50
West Branch Eightmile R.	North Plain, Conn.	1939 4/			
North Branch Park R.	Hartford, Conn.	1936	36.8	0.04	1.4

1/ Includes data available through water year 1947.
2/ Continuous record except period September 1923 to September 1928.
3/ Continuous record except period December 1911 to July 1914.
4/ Records not yet available.

Hourly flows in the smaller streams are often affected by regulated water storage practices by hydroelectric power plants and industrial establishments. Some of these plants practice diurnal regulation, storing all or a part of a day's flow for use during peak power demands or during the eight hours of industrial plant operation. This results in low flows between dams during the hours of storage.

Daily flows are also affected by water storage practices during periods of low flow. During these periods industrial plants accumulate water in mill ponds for periods of from one to five days, or whatever period is required to store sufficient water for plant operation. Utility plants store water until spillway levels are exceeded. The storage of water for public water supply during periods of low run-off also affects daily discharges. At these times, stream flows are low for periods of from one to several days and at times may approach zero.

Hydrologic Effects on Pollution

Most of the principal tributaries of the Connecticut River flow over comparatively rough terrain. While the average fall of streams varies considerably, there are few that average a fall of less than five feet per mile. The average fall is highest in the more rugged reaches of the northern parts of the basin. From the headwaters to the Massachusetts State line, the main stem averages a fall of about six feet per mile. Flowing across the broad plain in Massachusetts to tidewater at Enfield, Connecticut, the fall of the main stem averages about three feet per mile. The velocity of streams in the Connecticut River Basin is comparatively high.

The actual rates of reaeration of streams transporting pollution have not been measured. Reaeration rates are known to be high, however, as a result of high velocities, rocky bottoms, natural falls and rapid mixing. Regulated water storage has the effect of reducing reaeration. Ponds and reservoirs have the beneficial effect of collecting settleable pollution, thereby restricting somewhat the length of streams damaged by upstream pollution. This benefit is sometimes offset by creation of local nuisances behind dams. Mechanical reaeration is probably least in the main stem in Massachusetts and Connecticut but this is offset by greater volume and tidal dilution below Enfield Dam.

Extreme low flows, when they occur, are almost always in August, September and October and sometimes in December and January. High water temperatures sometimes combine with low flows and pollution to produce critical stream conditions. Water temperatures during these critical periods average about 75° F. and sometimes temperatures as high as 84° F. have been recorded.

Streams transporting pollution are generally free of ice cover and on ponds ice cover is not continuous for protracted periods except in the northern regions of the basin. There are no records of critical stream or pond water conditions developing as a result of deoxygenation during periods of ice cover.

Like most New England river basins, the streams of the Connecticut River system have high capacities for self-purification. The same amounts of pollution transported by a more sluggish river system would surely result in conditions of gross pollution and greater damages to water resources.

Floods

There is a record of flood occurrences in the Connecticut River Valley since the time of the first settlements. Flood areas exist in almost all reaches of the main stem and its principal tributaries. Most of these flood areas contain highly developed industrial, commercial, agricultural and urban sections where losses from floods have been considerable.

The greatest flood on record occurred in 1936. Considering only recent years, another major flood occurred in 1927 and in September 1938 a hurricane caused another great flood that almost exceeded that of 1927 and would have except for protection afforded by completed, or nearly completed protection works. Again in 1949 the lower part of the basin suffered a general flood. Local floods occur frequently and scarcely a year passes but that there is a flood in some part of the basin resulting in general local damages.

Run-offs are normally highest in the early spring when the melting snow cover and heavy spring rains combine to produce high flows that frequently approach or exceed flood proportions. Based on records of important floods since 1639, it has been determined that the frequency of larger floods occur approximately as follows: April, 34 percent; March, 27 percent; February, 10 percent; May, 7 percent; and November, 3 percent.

Flood Control Measures

The great floods of 1936, which followed so closely the major floods of 1927, resulted in action by the Federal Government, and by the States of the Connecticut River Basin, to take steps to prevent losses from future major floods. Under the Flood Control Act of 1936 the Federal Government authorized certain "works of improvement for the benefit of navigation and the control of destructive floods and other purposes." These works were to be designated by the President in their order of emergency and to be carried out under direction of the Secretary of War under the supervision of the Chief of Engineers, Department of the Army. Some of these works have since been completed, others have been modified or added to in accordance with recommendations made following studies subsequently and currently being made by the Corps of Engineers and as authorized by the Federal Government. Flood control projects as authorized are required not only to prevent losses from floods but, where feasible, the storage of water is to be used for irrigation, recreation, hydroelectric power development, or other practicable purposes.

To date the Federal Government has constructed dikes, flood walls and other local protection works in Connecticut at Hartford and East Hartford; in Massachusetts at Springfield, Riverdale, West Springfield, Chicopee, Northampton, Holyoke and Springdale. Dams and reservoirs for the storage of flood waters have been constructed at Knightville, Birch Hill and Tully in the Commonwealth of Massachusetts; at Surry Mountain in the State of New Hampshire; and at Union Village in the State of Vermont. The Federal Government has also entered into agreement with the States concerned for the construction of dams and flood water storage reservoirs to be located at Barre Falls, Massachusetts, and at Ball Mountain and Townshend, Vermont. A channel improvement project is under construction on the Mad River at Winsted, Connecticut, in the Farmington River Basin.

The original Flood Control Act of 1936 authorized the construction of ten reservoirs in New Hampshire and Vermont on tributaries of the Connecticut River. These have not all been constructed. The Connecticut River Basin flood control requirements have been under study by the Corps of Engineers since 1936. These problems will be given further thorough study by the agencies of the Federal Government and of the States during the survey currently in progress by the New England-New York Inter-Agency Committee to be completed by July 1, 1954. In addition the Corps of Engineers is making separate studies of flood control measures needed on the watersheds of the Israel River in New Hampshire and the Passumpsic River in Vermont.

The final plans for a complete program of flood prevention for the Connecticut River Basin await the actions to be taken on studies completed, in progress and contemplated. Cooperative action between the agencies of the Federal Government, agencies of the affected States and their citizens should produce a comprehensive flood control system for the Connecticut River Basin.

In October 1950 the President directed the Secretary of the Army to organize among the various Federal agencies a temporary interagency committee for the purpose of initiating a comprehensive survey of the resources of the New England-New York region. The New England-New York Inter-Agency Committee has been organized and is functioning under the chairmanship of the Department of the Army, other member agencies being the Departments of Agriculture, Commerce and Interior, the Federal Power Commission, and the Federal Security Agency. Under the provisions of Section 205, Public Law 516, 81st Congress, and other existing Federal laws, this Committee is conducting, in cooperation with State and local agencies, a comprehensive survey of the land and water resources of New England and New York and in which is included a study of the Connecticut River Basin for flood control and allied purposes.

Connecticut River Interstate Flood Control Compact

In 1936 the four States of the Connecticut River Basin organized an interstate compact for flood control. The Governors of the States appointed a committee of twelve, three from each of the States, to draw up agreements and formulate an interstate compact under the terms of Public Law 738 of the 1936 Flood Control Act of the 74th Congress. This was done and the agreements were presented to and passed by the State Legislatures during the ~~1947~~ 1937 sessions. However, the terms of this compact were not ratified by the Congress.

The interests of the separate States continued to be active in flood control although not as an interstate body, corporate and politic. In 1946 another compact was drawn up but failed of passage in various of the State Legislatures. At the present time another compact is before the State Legislatures and indications are that it is not in conflict with interests of the Federal Government, or any of the affected States, and as such is likely of passage, by the State Legislatures and ratification by the Congress.

Inasmuch as a comprehensive flood control program has far-reaching effects on the water resources and their uses, a synopsis of the proposed Connecticut River Flood Control Compact is presented as Appendix "D."

Part 8

ECONOMIC DEVELOPMENT

General

The early settlers in all parts of the Connecticut Basin were largely farmers and the first economy established was necessarily agricultural. Although supplemented by early trading and manufactures, farming remained the principal occupation for nearly one hundred years, a position it still maintains in some areas in the basin.

Even before the first white settlements there had been a thriving trade developed between Dutch and English traders and the native Indians. In 1649 the first ship built in the State of Connecticut was launched at Wethersfield. There followed a long period of a thriving shipbuilding industry along the lower Connecticut River and this was complemented by a flourishing trade with all parts of the world. It had not taken the English settlers long to realize that they could not live by agriculture alone. There were certain necessities of life they required as well as an outlet for their surplus crops, livestock, hides, etc. Until near the end of the nineteenth century practically all of the Connecticut River towns served as centers of commerce and shipping outlets for "back-country" goods.

The first manufactured products appeared early in the basin's history and most important among these were bricks, oak staves, wood products and tanned hides. Sawmills and gristmills were necessities of pioneer life and the products of these manufactures were among the first marketed. Towards the end of the seventeenth century water power sites were being developed in increasing numbers and the transition from an agrarian economy to a manufacturing economy began. Within a hundred years the transition was complete.

Water power was abundant in the Connecticut Basin and, coupled with Yankee ingenuity, the years have produced one of America's more important industrial areas. The first industries began with manufacturing in the homes, activities designed to serve local markets. When the local markets had been supplied, some of the manufacturers piled wares on their backs and set forth to find more distant markets. These peddlers established an ever-expanding market that provided impetus for the fledgling industries. From these humble beginnings was established the important industrial development of the Connecticut River Basin. As industry expanded the population grew, with large numbers of Europeans immigrating into the basin to toil in the mills.

Manufacturing

Manufacturing activities form the principal framework of the present-day economy of the Connecticut Basin and these are particularly concentrated in the lower one-third of the basin. There is specialty in products manufactured by some of the industrial cities but on a regional basis manufacturing is well diversified. The area has withstood past economic storms rather well.

There are a number of important industrial cities in the basin and the principal among these are Hartford, New Britain, Bristol and Manchester, Connecticut; Springfield, Holyoke, Westfield, Chicopee, Greenfield, Northampton, and Gardner, Massachusetts; Brattleboro, St. Johnsbury, and Bellows Falls, Vermont; and Keene, Claremont, Lebanon, and Littleton, New Hampshire. The industrial cities in Vermont and New Hampshire are much smaller than those of Connecticut and Massachusetts but are nevertheless most important to the general economy of the upper basin. In addition to the larger industrial cities there are many smaller communities scattered throughout the basin that contain one or more manufacturing enterprises of consequence. In this dispersion of manufacturing activity lies a good deal of the industrial strength and economic stability of the region.

The principal products manufactured are food and allied commodities, textile mill, apparel, primary metal, machinery, fabricated metal, lumber, furniture, paper, aircraft, leather, stone and glass, chemicals and printing. There is also a considerable activity in miscellaneous products manufacturing.

The following table demonstrates the distribution of employment by major industry groups in the principal manufacturing counties of the basin.

Table 3--Distribution of Employment by Major Industry Groups, Connecticut River Basin, 1947

State, County & Employment Group	% of Plants in Basin (approx.)	No. of Plants by Industry Group 1/											
		a	b	c	d	e	f	g	h	i	j	k	l
CONNECTICUT													
Hartford	100												
1-19 emp.		80	8	15	21	20	72	13	18	16	109	117	88
20-99 emp.		30	3	10	2	7	21	5	7	5	36	39	42
100 plus		4	7	8	1	1	5	5	2	10	28	33	29

Table 3--Distribution of Employment by Major Industry Groups, Connecticut River Basin, 1947 (Continued)

State, County & Employment Group	% of Plants in Basin (Approx.)	No. of Plants by Industry Group 1/											
		a	b	c	d	e	f	g	h	i	j	k	l
CONNECTICUT													
Litchfield	15												
1-19 emp.		13	-	3	17	3	14	3	8	2	22	17	11
20-99 emp.		2	1	1	3	1	2	-	2	1	7	4	8
100 plus		-	7	-	1	1	-	-	1	3	5	4	14
Middlesex	95												
1-19 emp.		8	4	5	5	5	13	4	5	1	12	11	23
20-99 emp.		3	10	3	-	2	3	3	2	3	11	5	15
100 plus		-	2	-	-	-	-	1	1	-	4	2	10
Tolland	30												
1-19 emp.		5	3	2	3	1	1	-	2	-	-	4	5
20-99 emp.		-	8	-	-	-	2	-	-	-	-	-	4
100 plus		-	8	-	-	-	-	-	-	-	-	-	2
MASSACHUSETTS													
Franklin	100												
1-19 emp.		11	-	-	28	2	7	1	3	2	4	10	10
20-99 emp.		2	-	2	1	-	2	1	-	3	3	5	5
100 plus		-	2	-	-	-	-	-	-	-	4	3	10
Hampden	100												
1-19 emp.		66	6	21	24	17	78	15	19	12	50	66	70
20-99 emp.		20	15	22	6	5	19	6	5	11	19	25	43
100 plus		6	15	8	4	1	10	3	1	9	11	13	41
Hampshire	100												
1-19 emp.		20	4	1	28	1	13	3	3	2	5	8	8
20-99 emp.		5	3	5	2	-	1	-	-	2	4	4	10
100 plus		-	10	1	-	1	-	1	-	-	1	-	11
Worcester	15												
1-19 emp.		92	44	42	48	62	78	24	20	13	84	91	124
20-99 emp.		31	46	33	8	42	26	3	3	17	37	56	94
100 plus		5	38	9	4	8	4	1	4	13	21	33	76
NEW HAMPSHIRE													
Cheshire	90												
1-19 emp.		1	4	-	32	2	4	2	-	1	5	4	3
20-99 emp.		3	3	-	11	6	1	1	-	1	-	3	10
100 plus		-	5	-	-	1	1	-	-	-	3	2	5

Table 3--Distribution of Employment by Major Industry Groups, Connecticut River Basin, 1947 (Continued)

State, County & Employment Group	% of Plants in Basin (Approx.)	No. of Plants by Industry Group 1/											
		a	b	c	d	e	f	g	h	i	j	k	l
NEW HAMPSHIRE													
Coös	30												
1-19 emp.		2	-	1	12	-	4	-	1	-	-	-	-
20-99 emp.		1	-	1	4	-	-	1	-	-	-	3	4
100 plus		-	1	-	-	1	-	1	-	-	-	-	7
Grafton	50												
1-19 emp.		4	-	-	35	2	9	-	2	-	2	-	6
20-99 emp.		-	1	2	9	-	2	-	1	-	-	1	7
100 plus		-	5	1	2	-	-	-	1	-	-	-	5
Sullivan	100												
1-19 emp.		3	-	1	18	-	2	-	3	-	2	1	3
20-99 emp.		2	1	1	4	-	1	-	-	-	-	-	2
100 plus		-	4	-	-	-	-	-	-	-	1	1	4
VERMONT													
Caledonia	100												
1-19 emp.		7	-	-	16	-	3	2	8	1	-	4	1
20-99 emp.		7	1	-	2	1	1	1	-	-	1	-	3
100 plus		-	-	1	-	-	-	-	-	-	-	2	-
Orange	100												
1-19 emp.		3	-	1	17	-	5	1	1	-	-	-	1
20-99 emp.		-	-	-	5	1	-	-	-	-	-	1	1
Windham	100												
1-19 emp.		7	-	1	33	1	5	1	3	-	4	3	3
20-99 emp.		-	-	1	9	2	4	-	-	-	1	-	11
100 plus		1	1	-	2	-	-	1	1	-	-	-	2
Windsor	100												
1-19 emp.		3	2	-	37	-	7	-	2	2	1	-	-
20-99 emp.		-	3	1	5	-	1	-	-	-	-	2	-
100 plus		1	6	-	1	-	-	-	-	2	-	4	1

See following page for footnotes.

1/ a - Food and allied products
b - Textile mill products
c - Apparel and allied products
d - Lumber and products, excluding furniture
e - Furniture and fixtures
f - Printing and publishing industries
g - Chemicals and allied products
h - Stone, clay, and glass products
i - Primary metal industries
j - Fabricated metal products
k - Machinery (not electrical)
l - All others (tobacco, paper, leather, etc.)

By far the greatest amount of industrial development has taken place in the lower portions of the basin. There are approximately five times the number of manufacturing establishments in Connecticut and Massachusetts as there are in Vermont and New Hampshire and these employ more than nine times as many persons as do their northern neighbors. Connecticut covers only 12.6 percent of the land area but contains 39.2 percent of all the manufacturing plants. Massachusetts accounts for 23.9 percent of the land area and contains 43.3 percent of the manufacturing establishments. Vermont and New Hampshire represent 62.5 percent of all of the land area in the basin but account for only 17.5 percent of the manufacturing plants.

Pertinent general statistics on manufacturing employment and income in 1947 are given in Table 4 which follows:

Table 4--General Statistics on Manufacturing Employment and Income in 1947 - Connecticut River Basin.

State	Estimated Number of Establishments in Basin	All Employees		Value Added to Products by Manufacture*
		Average Number for Year	Total Wages Received*	
Vermont	290	14,210	$35,889	$61,687
New Hampshire	218	12,160	30,367	52,119
Massachusetts	1,254	110,075	309,911	507,832
Connecticut	1,137	128,745	374,661	591,327
TOTALS	2,899	265,190	750,828	1,212,965

* Wages and value added to products figures in thousands of dollars.

Industry in the basin has shown a steady and appreciable growth through the years. In more recent years the basin has lost a large part of its textile and leather industry but this has been compensated for in part by the growth of the apparel industry. Whatever losses of industry have been suffered have been more than made up by the growth and expansion of the primary metal, fabricated metal and machinery industries. During the period 1939-1947 manufacturing experienced a substantial and most satisfying increase in the number of establishments, employment and income. A large share of this industrial growth and expansion was financed by New England capital. There is no doubt a considerable portion of this growth was due to production demands during World War II but post-war employment has remained relatively stable.

Table 5, which follows, shows the approximate increases in the number of manufacturing plants, average number of production workers employed during the year and value added to products by manufacture over the period 1939-1947.

Table 5--Estimated Increases in Manufacturing Growth, Employment and Income from 1939 Through 1947 - Connecticut River Basin

State	Increase in Establishments		Increase in Production Workers		Increase in Value Added to Products by Manufacture	
	Number	Percent	Number	Percent	Value*	Percent
Vermont	78	36.8	3,990	49.5	$38,110	162
New Hampshire	71	48.2	1,820	20.6	34,000	189
Massachusetts	298	31.2	37,790	55.5	342,240	205
Connecticut	363	47.0	36,250	51.0	367,580	164
Basin	810	38.8	79,850	50.9	781,930	181

* Money figures in thousands of dollars

The data contained in Tables 3, 4 and 5 tend to indicate clearly the importance of the manufacturing industries in the Connecticut River Basin to the general economy of the New England region. The basin contains many industries that are important to national defense. The development commissions of the various States have active programs in effect and there is a growing tendency to promote the movement of manufacturing establishments into the more rural and underdeveloped towns. Such a plan has a number of advantages for the manufacturers and has a decided stabilizing effect on the local economy.

In these days of increased production for national defense, as well as for an ever-increasing domestic consumption, there is every indication that the industrial growth of the Connecticut River Basin should continue. The region has much to offer in a large, skilled labor force, transportation facilities, desirable industrial sites and vast water resources.

Offsetting the regional advantages of the Connecticut Basin as a manufacturing center are the generally conceded factors of lack of fuel resources, comparatively high electric power rates and unfavorable shipping rates, both for raw materials into the basin and for outgoing finished goods. The advantages of the region are greater than the disadvantages and the general concensus of opinion is that industry will experience continued growth and most probably in the so-called "wet-process" industries.

Agriculture

The Connecticut River Basin contains some of the most fertile lands in New England, and it is most productive along the lower valley. Farming has long been important to the economic welfare of the region and it is especially so at present in the upper reaches of the basin. As it is practiced today, farming is largely specialized and there is little general farming. Livestock, livestock products, truck garden produce and tobacco are the leading sources of farm income.

About 23 percent of the total area of the basin is now in cleared farmland and of this, nine percent is represented by pasture. Twelve percent of the farm area is in cultivated crops and some two percent is lying idle. Fifty years ago approximately 40 percent of the basin was in farmland. This decrease in farmland has largely resulted from abandonment of large areas of cropland and pasture that have since reverted to forests, principally through the natural forces of regeneration.

The value of farmland varies considerably and is highest in the lower portions of the valley. The income per acre varies almost directly with the value of the land. Table 6, which follows, contains data on size of farms, income per acre, value per acre, and income from all products sold by State and county. These data are based on the 1945 agricultural census taken by the U. S. Department of Commerce.

Table 6 -- Data on Farm Size, Value and Income - Connecticut River Basin 1945

State and County	Average Acres Per Farm	Average Value Per Acre	Average Income Per Acre	Value of all Products Sold*
CONNECTICUT	83	$126	$81	$52,596
Hartford	56	219	177	42,763
Litchfield	112	110	40	1,771
Middlesex	57	127	106	3,036
New London	90	76	48	2,140
Tolland	74	97	58	2,886
MASSACHUSETTS	76	87	42	38,389
Berkshire	107	66	27	2,515
Franklin	84	62	41	9,191
Hampden	57	105	43	8,417
Hampshire	66	93	47	9,900
Worcester	67	101	49	8,366
VERMONT	146	30	16	24,734
Caledonia	153	27	20	6,770
Essex	198	21	13	1,154
Orange	150	24	16	5,782
Windham	126	41	17	4,934
Windsor	134	33	12	6,094
NEW HAMPSHIRE	145	28	16	9,299
Cheshire	110	44	34	3,779
Coos	176	25	15	1,998
Grafton	148	27	9	1,255
Sullivan	134	29	13	2,267

* Value of all products sold in thousands of dollars

The value of all farm products sold in 1945 is estimated to have been $125,000,000. The sale of livestock and livestock products accounted for nearly 75 percent of this income of which dairy and poultry products contributed 40 percent of the total revenue. The sale of tobacco, almost all from Hartford County, Connecticut, and Hampden County, Massachusetts, amounted to more than $20,000,000 and represented 16 percent of the total 1945 farm income.

The presence of nearby urban markets makes specialized farming practices profitable in the lower parts of the basin. Although the farms in Connecticut are small, the average income per farm in 1945 was $6,700. In Massachusetts, where there is less specialized crop farming and more dairying, the average farm income in 1945 was slightly more than $3,000. The portions of the basin in northern Massachusetts and those in Vermont and New Hampshire lie within the Boston-New York milkshed, and dairying is one of the principal farm occupations. Although the farms are considerably larger in the northern regions the average farm income in Vermont and New Hampshire was only slightly more than $2,300 in 1945. In most parts of the basin the farm woodlot contributes a small measure to the farm income.

All of the States of the basin, in cooperation with the U. S. Department of Agriculture, have active farm improvement programs in effect that have thus far been instituted over only 500,000 acres, including farm woodlands. Past research in Connecticut and Massachusetts has shown the desirability of irrigation practices. Irrigation at the right time has been clearly demonstrated to produce larger crops of higher quality.

Unless farm management and conservation measures are practiced it appears that the maximum agricultural development of the basin has been reached. Good soil conservation practice would dictate that about 10 percent of the present cleared farmland on the steep slopes should be returned to forest. The Connecticut River Basin falls within the 16th Soil Conservation District of the U. S. Department of Agriculture and, in cooperation with State agencies, has been subjected to intensive study. The Department reported to the President's Water Resources Policy Commission in 1950 that a number of land management and conservation measures were needed to be placed into effect to conserve the agricultural resources and to raise land use practices into better alignment with potential land productivity. The principal measures needed are contour strip cropping, terracing, healing of gullys, safe disposal of surface waters from pastures and fields, upstream floodwater and sediment control structures, development or improvement of drainage facilities, pasture improvement, retirement of steep slopes from cultivation and grazing, reforestation of lands unsuited to agricultural use, pasture rotation and improvement, use of cover crops, development of water supplies for farm use including supplemental irrigation, design and installation of irrigation equipment, stabilization of stream banks, improvement of farm wildlife habitat, and promotion of interfarm cooperation to assure success of many of the above measures.

While many of these measures have been instituted at various locations in the basin the comprehensive soil conservation and land management program is far from completion. The innovation of these measures, and others, would considerably increase agricultural output and conserve the land and water resources for maximum utilization. Although agricultural income is considerably less than manufacturing income it remains of large significance to the regional economy.

Forestry

About 67 percent of the basin is wooded. In the north there is a heavy forest growth of spruce, fir, beech, birch and maple; in the south white pine and mixed hardwoods predominate and the stands are interspersed with cleared farmlands. The mountainous rim along the Berkshire Hills is largely covered by conifers and hardwoods, almost all second growth and of questionable marketable value. In Connecticut oaks predominate; in Massachusetts growths are a mixture of white pine, northern hardwoods and oaks; and in Vermont and New Hampshire northern hardwoods and white pine predominate with spruce and fir at higher elevations.

Lumbering was once a major industry in Vermont and New Hampshire but the forests have been cut over until little remains of this industry. Parts of the Green Mountain and White Mountain National Forests lie within the watershed as do a number of State forests and public lands and these constitute about 11 percent of the forested lands. Reforestation programs are in effect in these areas and private land owners are being encouraged to practice good forest management. Despite the fact that the forests have been largely depleted, present and potential stands constitute a valuable natural resource that should be developed for the region's future economic welfare. The U. S. Department of Agriculture estimates that only about 40 percent of potential forest productivity of the basin is being realized at the present time.

The total income from the sale of forest products is not known. The sale of forest products from farms in 1945 amounted to an estimated $2,500,000. Forest products from farm woodlots are most significant to local economy in the northern regions and in Vermont this source of farm income accounts for nearly $1,500,000 annually. Within recent years there has been a growth of wood products specialties manufacturing and the availability of a large supply of suitable hardwoods indicates that there are opportunities in the expansion of this industry. The largest use of the forest products at the present time is for the manufacture of wood pulp for paper production.

Mining and Quarrying

Mineral deposits in a wide variety, but of relative insignificance commercially, are found in the Connecticut River Basin. Deposits discovered have ranged from gold and precious stones down through the pottery clays and glass silicas. In years gone by, mining and quarrying were important industries but many of these enterprises have long since become defunct.

Quarrying is important to local economy at several points in the basin. The granite industry is the principal source of employment and income from quarrying operations.

The mining of talc along the east central slope of the Green Mountains was once a significant industry but has since dwindled in importance. Portland, Connecticut, has a commercially important industry in the mining of feldspar and this community was once a center of the brownstone quarrying industry. Small amounts of mica are mined in Middlesex County, Connecticut, as they once were in the counties of Cheshire and Grafton, New Hampshire.

Commercially important copper veins are reported in the northern parts of the basin but are not likely to be worked until better methods of refining the low-grade ore are developed. Future developments in the mining and metal processing fields may make other mineral deposits commercially valuable. The growth of the use of cement and brick by the building industry caused a decline in the stone industry but it is possible that new uses and new markets will once again make this an important activity. As it is, the mineral and stone deposits of the basin represent a potentially important natural resource that is of relative economic unimportance at present.

Recreation

The Connecticut River Basin has excellent resources in all of the natural facilities required for outdoor recreation. The mountainous rim of the basin provides excellent sites for sporting and recreational development. Interspersed throughout the basin are more than a hundred impounded reservoirs and natural lakes, many of which are suitable for recreational development. In the southern portions of the basin almost all of the lakes and ponds have been set aside for public water supplies and their use is restricted to this purpose, thus creating a shortage of water recreation facilities.

There has been a tremendous investment of recreational capital in summer homes, resorts, hotels and recreational facilities. Such developments have been made along the rim of the basin from the Canadian border to Long Island Sound and to a lesser extent in the central parts of the valley.

All of the States and some of the towns have acquired public lands for public recreational development. Small portions of the White and Green Mountain National forest lie within the basin. Some of these areas have been developed for public recreational use and this development is planned for other areas but the process has been slow.

Recreation is big business in the basin and is particularly significant to the economy of Vermont and New Hampshire. The exact income from the recreation industry is not known but is estimated to annually approach $100,000,000 and that possibly two or three times this amount is now expended each year for construction, improvement and development of recreational facilities and services. By far the greatest share of the recreational facilities have been developed by and are operated by private capital. The private development of the recreational industry is encouraged by the States and conflicts with public developments are avoided. Recreation, especially in the northern regions, is probably the fastest growing industry in the basin.

Despite the rapid growth of private recreation facilities and the development of some public lands there is a shortage of recreation in the basin, more especially in public facilities. The expansion of this industry has produced a number of conflicts and problems that grow more acute as demands for recreation opportunities increase. Among the important problems and conflicts that must be resolved are: (1) the formulation of a sound regional plan for recreational development; (2) the conflict between recreational interests and restricted public water supply watersheds; (3) development of flood control reservoir sites for recreation, where justifiable; (4) water conservation practices; (5) increased fish and wildlife propagation; (6) preservation of some of the remaining lakeshore areas for public development; and (7) water pollution control.

Other needs are for recreational facilities in and near urban centers of population, such as the park systems developed by Hartford, Connecticut, and Springfield, Massachusetts. Recreation is not only important to the economic stability of the basin but should be developed to serve the health and welfare of the general public as well.

Commercial Fishing

Commercial fishing is of relatively minor economic importance in the Connecticut River Basin. In years past this industry was significant but natural factors, dam construction, pollution and dredging operations have combined to reduce the income from this source. Oysters, clams, lobsters and shad were once to be found in large numbers. In recent years the shad have been returning to the Connecticut River in increasing numbers and this is probably due in large part to anti-pollution measures placed in effect and to regulation of amount of catch. In 1946, more than a million pounds of shad were caught commercially in Connecticut and were valued by the State Board of Fisheries and Game at $162,000. Probably the total shad run in the river had a value in excess of $200,000. Recently the alewife run has been exploited commercially for the first time in years.

Population

The population of the Connecticut River Basin has shown a steady growth through the years. As the manufacturing enterprises developed and expanded large numbers of immigrants from

Eruope poured into the basin to work in the mills, adding to the natural multiplication of the population. Population growth has been largest in the southern portions where industrial development has been more extensive. Some of the northern regions have experienced a loss in population in recent years and this has been due to a number of factors.

The reported 1930 population of the basin was 1,230,000; in 1940 it was estimated to be 1,343,000; and from the preliminary releases of the seventeenth census, the 1950 population was computed to be 1,530,240. These figures indicate the population density of the basin in 1950 to have been 136.6 persons per square mile. The population density varies considerably by State, being 41.2 in Vermont, 46.2 in New Hampshire, 214.1 in Massachusetts, and 450.7 in Connecticut. In terms of persons per square mile compared to the country as a whole, the Connecticut River Basin is densely populated. Table 7, which follows, gives estimated 1940 and 1950 populations by State and county.

Table 7 -- Estimated 1940 and 1950 Populations by State and County - Connecticut River Basin

State and County	Estimated Population	
	1940 1/	1950 2/
NEW HAMPSHIRE	138,560	143,740
Cheshire	34,950	38,680
Coos	23,560	21,440
Grafton	40,180	42,930
Hillsboro	11,400	12,000
Merrimack	3,030	3,140
Sullivan	25,440	25,550
VERMONT	160,070	163,970
Addison	620	600
Bennington	2,380	2,230
Caledonia	24,320	24,000
Essex	6,450	6,200
Orange	17,050	17,000
Orleans	1,080	1,060
Rutland	910	920
Washington	41,550	42,740
Windham	27,850	28,660
Windsor	37,860	40,560

Table 7--Estimated 1940 and 1950 Populations by State and County - Connecticut River Basin

State and County	Estimated Population 1940 1/	1950 2/
MASSACHUSETTS	525,960	580,240
Berkshire	2,310	2,450
Franklin	49,450	52,580
Hampden	330,960	366,030
Hampshire	72,460	86,470
Worcester	70,780	72,710
CONNECTICUT	518,710	642,290
Hartford	436,600	522,640
Litchfield	12,040	14,660
Middlesex	50,110	79,670
New Haven	1,970	2,190
New London	4,920	5,400
Tolland	13,070	17,730
TOTAL	1,343,300	1,530,240

1/ 1940 populations computed from the Sixteenth Census of the United States.

2/ 1950 populations computed from preliminary releases of the Seventeenth Census of the United States

There are 39 cities and urban towns in the basin of which three are partly in adjoining watersheds. The residents of cities and urban towns account for approximately 61 percent of the total population. The farm population accounts for about 10 percent of the total and persons living in villages in non-urban towns account for the remaining 29 percent of the population. Of the urban cities and towns, four are located in New Hampshire, five are in Vermont, 20 are in Massachusetts, and 10 are in Connecticut. Hartford, Connecticut, is the largest city in the basin, having a 1950 population of 177,073, and is closely followed by Springfield, Massachusetts, with a 1950 population of 162,601. The largest city in New Hampshire is Keene, the 1950 population being 15,631 and in Vermont it is the village of Brattleboro with a 1950 population reported to be 11,494. The largest increases in population have occurred in the rural towns, particularly the satellites of the larger cities. Table 8, which follows, contains the 1940 and 1950 populations of cities and urban towns in the Connecticut River Basin.

Table 8 -- 1940 and 1950 Populations of Cities and Urban Towns - Connecticut River Basin

State and County	City or Urban Town	1940 Population	1950 Population
NEW HAMPSHIRE			
Cheshire	Keene (C)	13,832	15,631
Grafton	Lebanon (T)	7,590	8,452
	Littleton (T)	4,571	4,768
	Claremont (C)	12,144	12,058
	Newport (T)	5,304	5,047
VERMONT			
Caledonia	St. Johnsbury (T)	9,095	9,281
Windham	Bellows Falls (T)	4,236	3,863
	Brattleboro (V)	10,983	11,494
Windsor	Windsor (V)	3,402	3,452
	Springfield (T)	5,182	4,907
MASSACHUSETTS			
Franklin	Greenfield (T)	15,672	17,237
	Orange	5,611	5,880
	Montague (T)	7,582	7,793
Hampden	Chicopee (C)	41,664	48,939
	Holyoke (C)	53,750	54,441
	Longmeadow (T)	5,790	6,453
	Ludlow (T)	8,181	8,629
	Palmer (T)	9,149	9,524
	Springfield (C)	149,554	162,601
	Westfield (C)	18,793	20,961
	W. Springfield (T)	17,135	20,398
Hampshire	Amherst (T)	6,410	10,850
	Easthampton (T)	10,316	10,694
	Northampton (C)	24,794	28,998
	South Hadley (T)	6,856	10,122
	Ware (T)	7,557	7,495
Worcester	Athol (T)	11,180	11,540
	Gardner (C)	20,206	19,617
	Spencer (T)	6,641	7,047
	Winchendon (T)	6,575	6,477

Table 8 -- 1940 and 1950 Populations of Cities and Urban Towns - Connecticut River Basin (Continued)

State and County	City or Urban Town	1940 Population	1950 Populatio
CONNECTICUT			
Hartford	Bristol (C)	30,167	35,873
	East Hartford (T)	18,615	29,340
	Hartford (C)	166,267	177,073
	New Britain (C)	68,685	73,663
	Southington (B) 2/	9,649	12,923
	West Hartford (T)	33,776	44,401
Litchfield	Torrington (C) 2/	26,988	27,770
	Winsted (C)	7,674	8,729
Middlesex	Middletown (C)	26,495	29,665
New Haven	Meriden (C) 2/	39,494	43,747

1/ V - Village; B - Borough; T - Town; C - City
2/ Partly included in other river basin

Income

Accurate data on the income of residents of the basin are not available. There is, however, sufficient information to give reasonable estimates of the incomes of certain groups. In Vermont in 1947, all manufacturing employees averaged on annual wage of $2,525; in New Hampshire the average for this group was $2,500; in Massachusetts it was $2,815; and was highest in Connecticut at $2,830. Connecticut also led in the average income per farm which, in 1945, was $6,700 compared to $3,000 in Massachusetts, and $2,300 in Vermont and New Hampshire. A buying power survey made in 1948 indicates that in the manufacturing fields there are an average of two employees per family and that the average buying power per family is about two times the average shown for manufacturing employees.

Since all manufacturing employees and farm groups account for approximately three-fourths of all employment in the basin it is indicated that the average buying income per family in industrial areas ranges from $5,000 to $5,600 annually and in farm areas it averages from $2,300 to $6,700, the lower average prevailing in the northern regions. The incomes of the self-employed and of the service and professional groups are not known but per capita income figures would indicate the average of all to be somewhat less than that of manufacturing employees.

The 1950 Dun and Bradstreet reference book lists the per capita income in Vermont at $1,075; in New Hampshire, $1,195; in Massachusetts, $1,417; and again Connecticut incomes are highest, the per capita being $1,591. The per capita incomes in Vermont and New Hampshire are lower than that of the country as a whole while in Massachusetts and Connecticut they are higher.

Part 9

USES OF THE WATER RESOURCES

General

Water is, and has always been, one of the most important natural resources of the Connecticut River Basin. From the time of the first settlements to the present, water has played a prominent role in the economic development and growth of the area. The considerable industrial development was largely a result of the quantity, quality and power potential of the water resources. A large share of the present-day recreational development is due to the vast water resources available.

The development of the economic structure of the basin has been diverse and the use of the water resources for almost all normal purposes is widespread. Today the water uses are for domestic, industrial, and livestock water supply, game fishing, recreational bathing, boating and yachting, commercial fishing, shellfish propagation, wildlife habitat, navigation, hydroelectric power development, irrigation, and transportation of wastes.

Figure 2 shows existing primary water uses.

Domestic Water Supply

The primary use of the water resources of the Connecticut Basin is for domestic water supply. All of the public surface water supplies in Connecticut and Massachusetts, and the majority of those in Vermont and New Hampshire are taken from watersheds protected from pollution and subject to periodic sanitary inspections. Public ground water supplies are derived from springs, wells, and reservoirs fed by ground waters. All public water supplies have been approved by the State health departments and are routinely analyzed.

There are 230 communities within the basin served by 176 public water supply systems. Ninety-two of the supplies originate principally in surface waters and 84 in ground waters. Eleven of the surface water supplies have auxiliary or emergency ground water supplies, and 13 of the ground water supplies are supplemented with surface waters. Two small communities in Connecticut are served by another water supply located outside the watershed. In Massachusetts, the Metropolitan (Boston) District Commission takes a large part of its supply from the Swift and Ware Rivers in the Connecticut River Basin. Limited diversions from the Swift River are impounded in the 415 billion gallon Quabbin Reservoir, and limited diversions from the Ware River may be stored in either the Quabbin or Wachusetts Reservoirs. In 1949, the Metropolitan District Commission diverted

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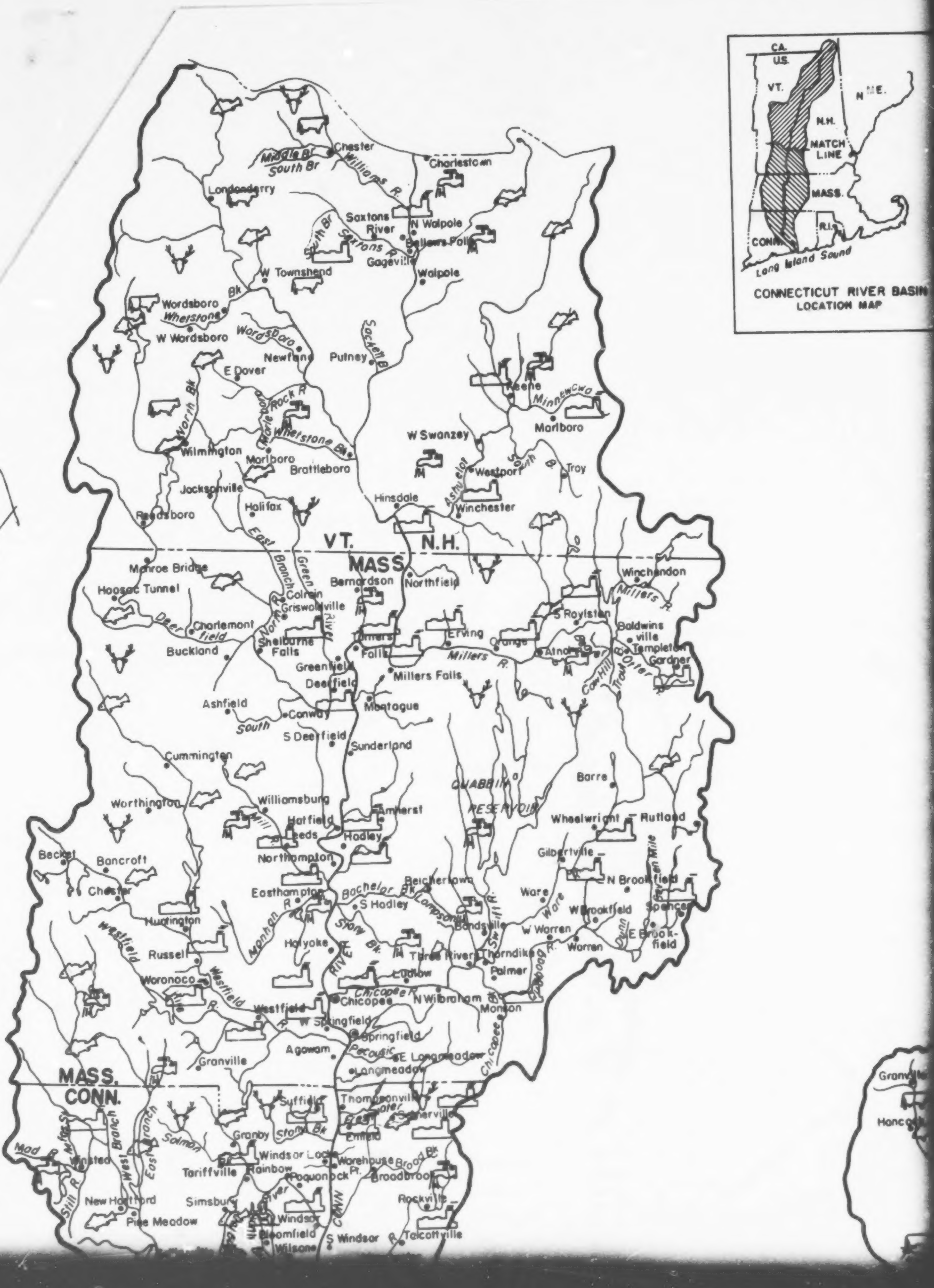

CONNECTICUT RIVER BASIN
LOCATION MAP
CA.
U.S.
VT.
N.H.
ME.
MATCH LINE
MASS.
R.I.
CONN.
Long Island Sound
VT.
N.H.
MASS.
MASS.
CONN.
Chester
Middle Br
South Br
Williams R.
Charlestown
Londonderry
Saxtons River
N Walpole
Bellows Falls
South Br
Saxtons R.
Gageville
Walpole
W Townshend
Wordsboro
Wherstone Bk
W Wordsboro
Wordsboro
Newfane
Putney
Sackett Bk
E Dover
Rock R.
Keene
Minnewawa
Marlboro
North Bk
Wherstone Bk
W Swanzey
Wilmington
Marlboro
Brattleboro
Westport
South B.
Troy
Ashuelot
Jacksonville
Hinsdale
Winchester
Halifax
Readsboro
East Branch
Green River
Monroe Bridge
Bernardson
Northfield
Winchendon
Hoosac Tunnel
Colrain
Griswoldville
Millers R.
North R.
Charlemont
Deerfield
S Royalston
Baldwinsville
Shelburne Falls
Turners Falls
Erving
Orange
Athol
Templeton
Gardner
Buckland
Greenfield
Millers R.
Millers Falls
Deerfield
Trout Otter R.
Ashfield
Conway
Montague
South
S Deerfield
Sunderland
Cummington
QUABBIN RESERVOIR
Barre
Worthington
Williamsburg
Hatfield
Amherst
Wheelwright
Rutland
Leeds
Hadley
Becket
Bancroft
Northampton
Gilbertville
Belchertown
N Brookfield
Chester
Easthampton
Bachelor Bk
S Hadley
Ware
Spencer
Swift R.
Ware
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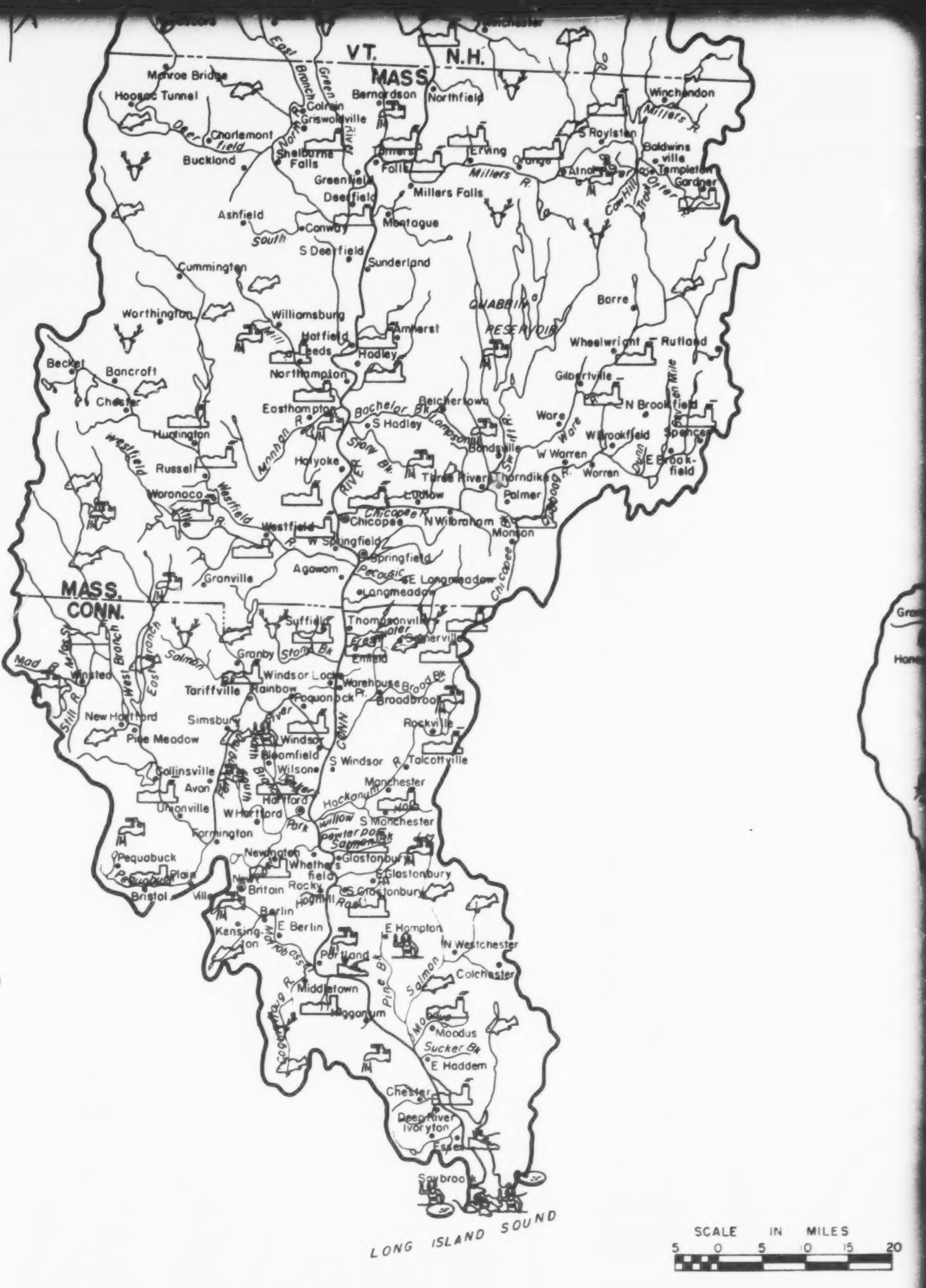
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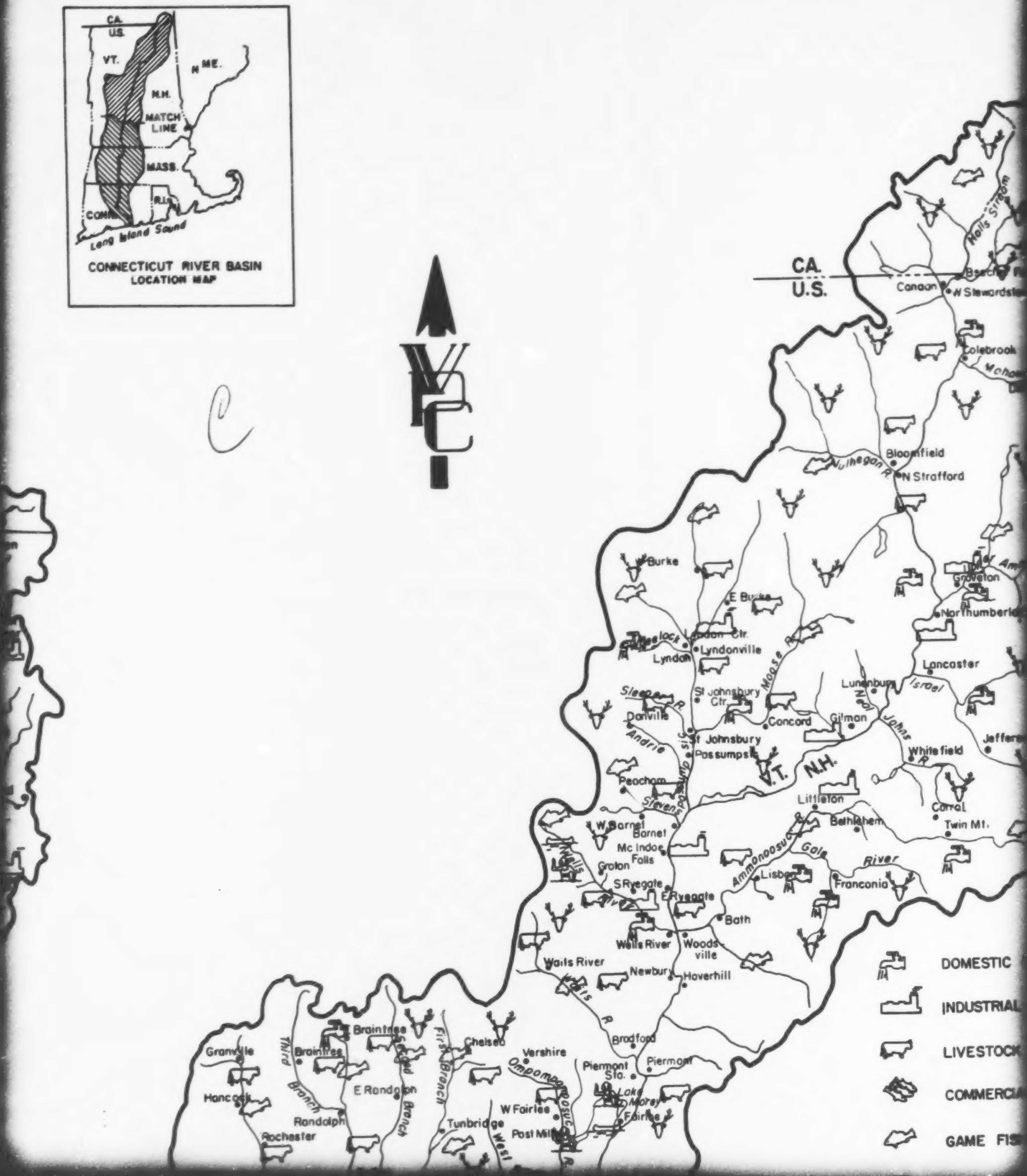
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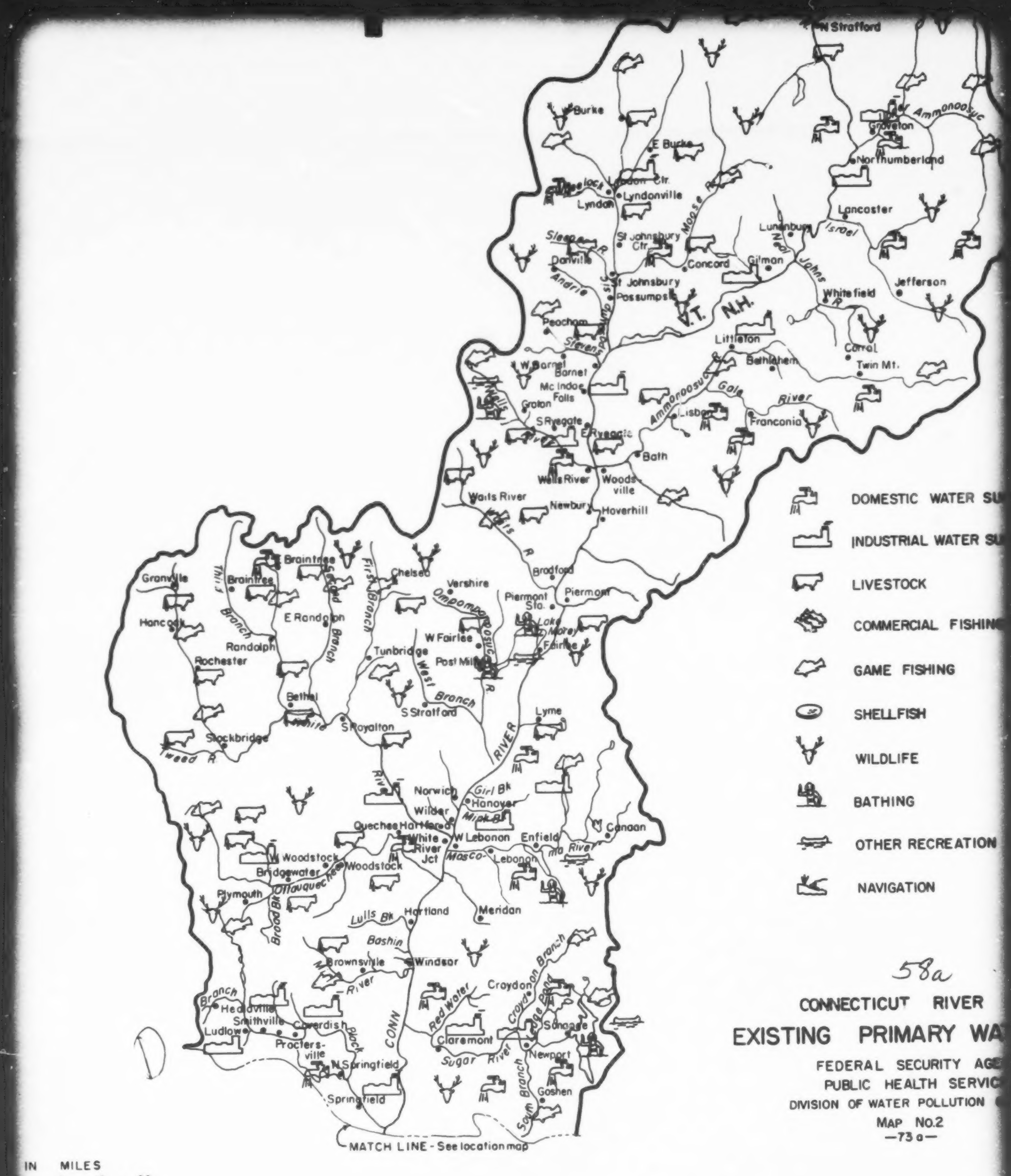
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58a

CONNECTICUT RIVER

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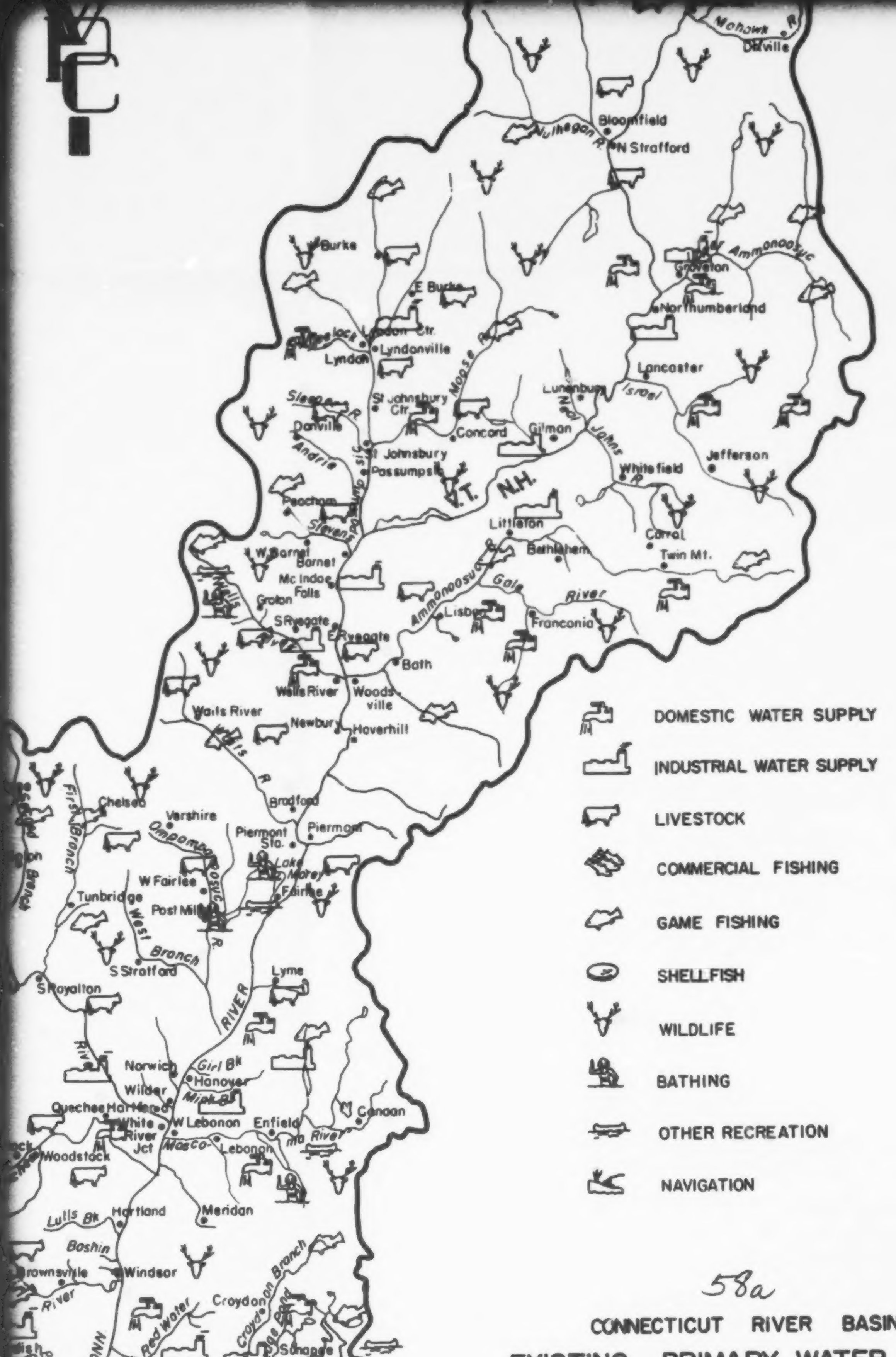
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SHELLFISH
WILDLIFE
BATHING
OTHER RECREATION
NAVIGATION

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58a

CONNECTICUT RIVER BASIN

EXISTING PRIMARY WATER USES

FEDERAL SECURITY AGENCY
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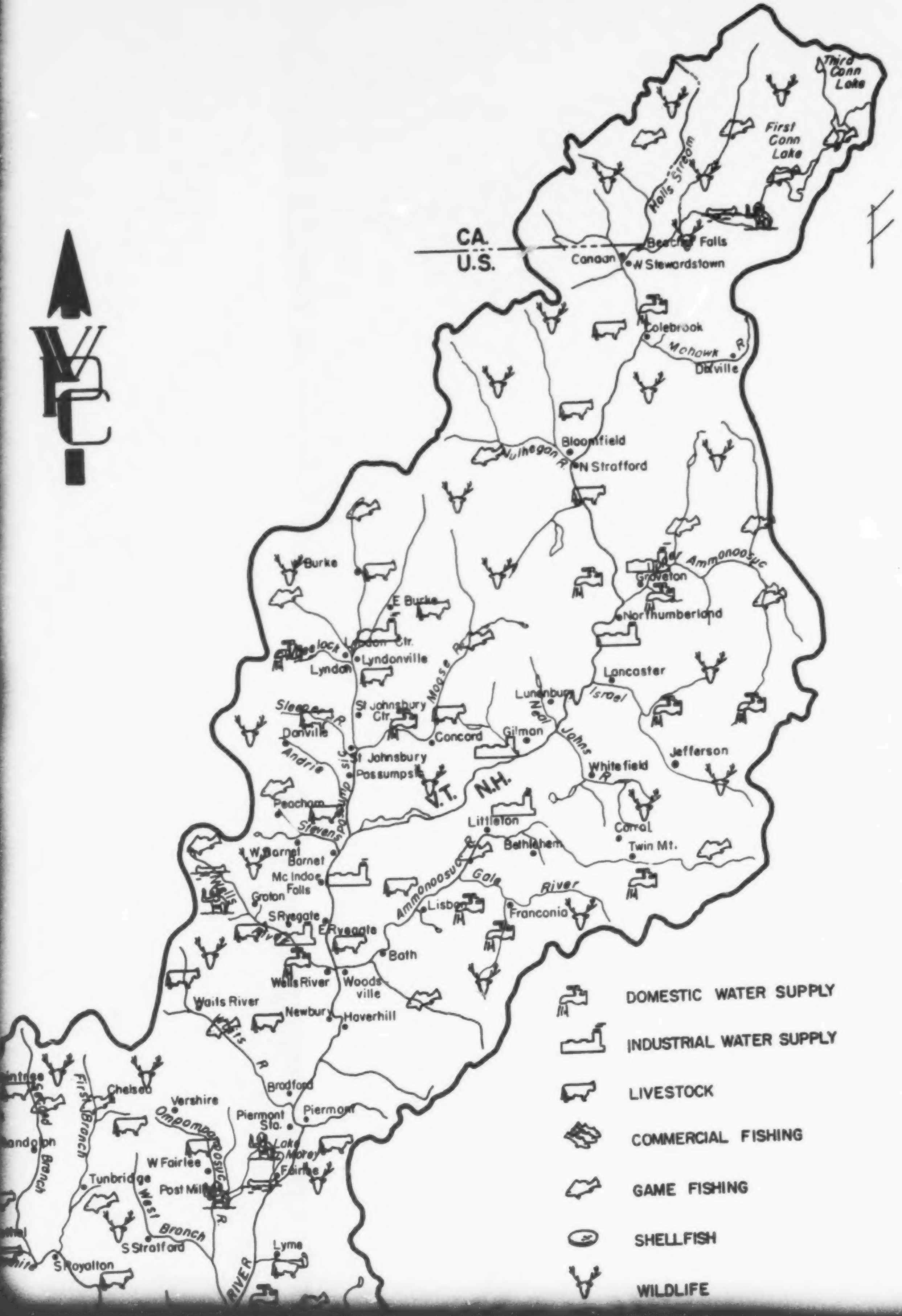
DIVISION OF WATER POLLUTION CONTROL

MAP NO.2

CA.
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a total of 37,868 million gallons of water from the basin, 57 percent of all the water delivered by it during that year, and almost equal to all of the water consumed by communities within the basin.

There is a total of approximately 1,134,000 persons in the basin served by public water supplies and this represents 74 percent of the total population. Surface water supplies serve 1,034,000 persons and ground water supplies serve 100,000 persons. There are no complete data available but from existing information the total public water consumption is estimated to be 124,435,000 gallons per day, of which 90 percent is taken from surface water resources. It is estimated that public ground water supplies furnish 10,130,000 gallons per day against 114,305,000 by surface water supplies. The per capita consumption of public water supply in the basin is approximately 110 gallons per day, indicating that an appreciable quantity, possibly 30 percent, is purchased by industry for process water.

With few exceptions all surface public water supplies are disinfected by chlorine before distribution. The vast majority of the ground waters are distributed without treatment except for occasional chlorination and chemical treatment for corrosion control.

There has been a decided increase in the amount of water supplied by public systems in recent years. In some areas it has amounted to as much as 50 percent and the demands have been greatest in the more highly developed lower portions of the basin. The increase in demand has been due in part to an increased domestic population served but more largely it has resulted from increased volumes supplied to industry. There are no areas of critical water shortage at the present time but an increased domestic and industrial population in the future may create public water supply shortages. There are areas at present, during prolonged periods of drouth, when low run-off and receding ground water tables produce critical water supply problems.

The quality of public water supplies is generally very good. Surface waters tend to be quite soft and of good chemical quality, although sometimes fairly high in color. Ground waters in the lower parts of the valley are relatively soft and on the average of good chemical quality. In the northern regions the ground waters are considerably harder and not of as desirable chemical quality.

Table 9 presents a census of existing public water supplies in the Connecticut River Basin.

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Connecticut				
Avon (T)	-	-	Served partly by Collinsville	FC
Avon (T)	750	0.049	Gravel packed wells	None
Berlin (T)	-	-	Served by New Britain	DFC
Bloomfield (T)	-	-	" " Hartford	DF
Blue Hills (V) (Bloomfield T)	-	-	" " "	DF
Bristol (C)	35,000	3.5	Reservoir #1; gravel packed well	DFC
Broad Brook (V) (East Windsor T)	700	-	Drilled wells	None
Canton (T)	-	-	Served by Collinsville	FC
Centerbrook (V) (Essex T)	-	-	" " Chester	DC
Chester (T)	7,500	-	Chester Reservoir	DC
Clinton (T)	-	-	Served by Guilford	DC
Collinsville (V) (Canton T)	(3,000)	-	Nepaug Reservoir; Huckleberry Hill Spring	FC None
Cromwell (T)	3,000	-	Driven and gravel packed wells	None
Deep River (T)	-	-	Served by Chester	DC
Durham (T)	200	-	Spring & drilled well	None
Durham Center (V) (Durham T)	100	0.008	Brook	D
East Berlin (V) (Berlin T)	-	-	Served by New Britain	DFC

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
E. Farmington Hts. (V) (Farmington T)	100	-	Drilled wells	None
East Hartford (T)	-	-	Served by Hartford	DF
East Windsor (T) (Warehouse Point)	-	-	" " Thompsonville	D
Ellington (T)	350	0.004	Drilled wells	None
Elmwood (V) (W. Hartford T)	-	Included in W. Hartford (T)		
Enfield (T)	-	-	Served by Thompsonville	D
Essex (T)	-	-	" " Chester	DC
Farmington (T)	1,600	0.135	Wadsworth Reservoir	DF
Forestville (V) (Bristol T)	-	-	Served by Bristol	DFC
Glastonbury (T)	-	-	" " Hartford	DF
—J. B. Williams Co.	300	-	Reservoir	D
Granby (T)	300	-	Bissell's Brook	D
Hartford (C)				
—Metropolitan Water Dist.	294,000	29.5	Barkhamstedt; Nepaug & West Hartford Reservoirs	DF
—E. Hartford Div.		3.5	Cold Brook & Salmon Brook Reservoirs	D
Hazardville (V) (Enfield T)	1,700	0.039	Drilled Wells	C
Ivoryton (V) (Essex T)	-	-	Served by Chester	DC
Kensington (V) (Berlin T)	-	-	" " New Britain	DFC

Table 9—Census of Public Water Supplies,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Manchester (T) (North)	11,100	0.8	Reservoirs	D
" " (South)	21,000	1.20	Roaring Brook Res.; Porter Reservoir	DF D
Middletown (T)	23,000	1.57	Mt. Higby Reservoir	D
New Britain (C)	84,000	8.0	Shuttle Meadow Res; Whiquille Reservoir; White Bridge Driven wells	DFC D
New Hartford (T)				
—Pine Meadow	1,000	-	New Hartford Res.	D
—Village Water Co.	300	-	Spruce Brook Res.	D
Newington (T) (part)	-	-	Served by New Britain	DFC
Newington Center (V) (Newington T)	-	-	" " Hartford	DF
Newington Junction (Newington T)	-	-	" " "	DF
Old Saybrook (T)	-	-	" " Guilford	DC
Pequabuck (V) (Plymouth T)	-	-	" " Bristol	DF
Portland (T)	3,500	0.27	Portland Reservoir	D
Rockville (V) (Vernon T)	9,000	1.7	Snipsic Lake	D
Rocky Hill (T)	-	-	Served by Hartford	DF
Saybrook (V) (Old Saybrook T)	-	-	" " Chester	DC
Saybrook Point (V) (Old Saybrook T)	-	-	" " Guilford	DC

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Simsbury (T)				
—Village Water Co.	1,500	0.11	Tuller Reservoir	DFC
— Water Co.	100	-	Grimes Brook	D
Somers (T)	250	-	Brook, spring, Deep well	F None
S. Glastonbury (V) (Glastonbury T)	-	-	Served by Hartford	DF
S. Windsor (T) (part)	-	-	Served by Hartford	DF
Suffield (T)	2,550	-	Drilled wells	None
Tariffville (F.D.) (Simsbury T)	530	-	Gravel packed driven well	None
Terryville (V) (Plymouth T)	4,500	-	Reservoirs; Gravel packed well	D None
Thompsonville (V) (Enfield T)	13,600	-	Caisson well	D
Unionville (V) (Farmington T)	2,500	0.35	Reservoir	D
Warehouse Point (V) (East Windsor T)	-	-	Served by Thompsonville	D
Weatoque (V) (Simsbury T)	-	-	Served by Simsbury	DFC
West Hartford (T)	-	-	" " Hartford	DF
Westover Plain	125	-	Spring	None
Wethersfield (T)	-	-	Served by Hartford	DF
Windsor (T)	-	-	" " "	DF
Windsor Locks (T)	4,400	-	Reservoir	D
Winsted (C)	10,000	-	Crystal Lake	D

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Massachusetts				
Agawam (T)	-	-	Served by Springfield	DF
Amherst (T)	6,400	0.885	Amethyst Brook Res.; Atkins Pond	D
Ashfield (T)	400	-	Highland Spring Res.	None
Athol (T)	11,200	0.55	Newton, Phillipstown & Thousand Acre Brook Reservoir	DFC
Barre (T)	3,500	0.67	Gravel packed well; Allen Hill Reservoir	None D
Belchertown (W.D.) (Belchertown T)	650	0.05	Tubular wells	None
Bernardston (F. & W.D.) (Bernardston T)	190	-	Dug well	None
Blandford (T)	480	0.019	Freeland Brook reservoirs	None
Bondsville (V) (Palmer T)	-	-	Served by Palmer	D
Brookfield (T)	1,395	0.50	Cooley Hill Res.	None
Buckland (T)	-	-	Served by Shelburne	None
Chester (T)	1,000	-	Brook Res. & Horn Pond	None
Chicopee (C)	41,600	3.47	Cooley Brook and Morton Brook Res.	DFC
Colrain (T)				
—Griswoldville (V)	300	0.03	McClelland Brook Reservoir and well	D
—Fire District #1	100	0.006	Mountain Brook Res.	D
Cummington (T)	200	0.007	Springs	None

Table 9—Census of Public Water Supplies,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Deerfield (T)				
—Deerfield (F.D.)	980	-	Dug & tubular wells; springs; gravel packed well	None
—So. Deerfield (W.D.)	1,450	-	Roaring Brook Res.	D
East Brookfield (T)	1,030	0.066	Dug well	None
Easthampton (T)	10,315	1.521	Tubular wells	None
East Longmeadow (T)	-	-	Served by Springfield	F
Erving (T)	-	-	" " Montague	D
Feeding Hills (V) (Agawam T)	-	-	" " Agawam	DF
Gill (T)	295	-	Springs	None
Granville (T)	90	0.002	Dug well, tubular well & springs	None
Greenfield (T)	16,700	1.38	Glen Brook Res., inf. gal., gravel packed wells	DF
Hadley (T)	2,000	-	Harts Brook reservoirs	None
Hardwick (T)				
—Gilbertville (V)	1,315	-	Dug & tubular wells; springs	None
—Hardwick Center (V)	100	-	Dug well	None
—Wheelwright (V)	200	-	Tubular well	None
Hatfield (T)	2,430	-	Running Gutter Brook Reservoir	D
Holyoke (C)	53,750	9.454	Ponds and impounding reservoir	D

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Huntington (T)	1,100	-	Cold Brook Reservoir	None
Longmeadow (T)	5,790	-	Served by Springfield	F
Ludlow (T)		0.508	" " "	DF
Millers Falls (V) (Montague T)			" " Montague	D
Monroe (T)	200	0.02	Phelps Brk. Res.	DF
Monson (T)	5,195	0.408	Dug wells and Ingalls Brook	D
Montague (T)				
—Turners Falls (V)	6,300	0.912	Lake Pleasant	D
—Montague Village (V)	450	0.031	Dug wells	None
Northampton (C)	24,800	3.00	Mountain St. Res.	D
North Brookfield (T)	3,305	0.558	North & Doane Ponds	D
Northfield (T)				
—Northfield Schools Inc.	550	-	Louisiana Brk. Res.	D
—Northfield Water Co.	480	-	Minot Brook Res.	None
North Wilbraham (V) (Wilbraham T)	-	-	Served by Wilbraham (T)	DF
Orange (T)	4,300	0.350	Crystal Spring Coolidge Brk. Res.; gravel packed well	D
Palmer (T)				
—F.D. #1	2,660	0.20	Graves Brook Res.	D
—Three Rivers (F.D.)	2,005	-	Tubular wells	None
—Bondsville W. Co.	1,180	-	Tubular wells	None

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Palmer (T)				
—Thorndike Village (V) - Wm. Holden Supply	460	-	Reservoir & springs	D
Paxton (T)	825	0.030	Springs	None
Russell (T)	1,240	0.403	Black Brk. Res.; Gravel packed well	F None
Shelburne (T)				
—Shelburne Falls (F.D.)	2,200	0.083	Fox Brook Reservoir	None
Southampton (T)	500	0.060	Holyoke raw water	None
South Barre (V) (Barre T)	-	-	Served by Barre (T)	D
South Deerfield (V) (Deerfield T)	-	-	" " Deerfield (T)	D
South Hadley (T)				
—Fire Dist. #1	4,290	-	Buttery Brook and Leaping Well Res.	D
—Fire Dist. #2	1,710	-	Elmer Brook Res., Dug wells & Inf. gal.	F None
Southwick (T)	-	-	Served by Springfield	F
Spencer (T)	5,000	-	Shaw Pond	D
Springfield (C)				
—Ludlow Plant	11,500	-	Ludlow Reservoir	D
—West Parish Plant	166,000	23.172	Cobble Mountain Res.	F
Sunderland (T)	505	-	Saw Mill Brook Res.	F
Templeton (T)	-	-	Served by Templeton -Fernald State School	None

Table 9—Census of Public Water Supplies,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Thorndike (V) (Palmer T)	-	-	Served by Palmer (T)	D
Three Rivers (V) (Palmer T)	-	-	" " "	None
Turners Falls (V) (Montague T)	-	-	" " Montague (T)	D
Ware (T)	7,500	0.56	Wells	DC
Warren (T)				
—Warren Water Dist.	2,000	0.170	Tubular wells	None
—West Warren W. Co.	1,310	-	Dug well	None
Waterville (V) (Winchendon T)	-	-	Served by Winchendon (T)	D
West Brookfield (T)	1,100	0.182	Tubular wells	None
Westfield (C)	18,790	2.45	Reservoirs	D
Westhampton (T)	180	-	Mountain Brook Res.	None
West Springfield (T)	17,140	1.34	Bear Hole Brook Res. Gravel packed wells	DF D
W. Warren (V) (Warren T)	-	-	Served by Warren	None
Whately (T)	140	-	Springs	None
—N.L. Crafts Supply	30	-	Springs	None
Wilbraham (T)	-	-	Served by Springfield	DF
Williamsburg (T)	1,600	-	Unquomonk Brook Res.	D
Winchendon (T)	6,575	0.180	Dug wells	D
Woodlawn	-	-	Served by S. Hadley	DF
Worthington (T)	345	0.009	Springs	None

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
New Hampshire				
Bath (T)	100	0.005	Spring	None
Bethlehem (T)	450	-	Zealand River & East Branch of Gale River	None
Canaan (T)	700	0.45	Crystal Lake	D
Carroll (T)	400	0.02	Stream	None
Charlestown (T)	1,700	0.078	Clay Brook	None
Claremont (C)	14,000	0.60	Grandy Brook and Whitewater Brook	D
Colebrook (T)	1,500	0.20	Beaver Brook and driven wells	D
Enfield (T)	1,200	0.20	Moose Brook (imp.)	D
Franconia (T)	450	0.015	Springs (2)	None
Groveton (V) (Northumberland T)	2,000	0.05	Ames Brook and 3 unnamed brooks	None
Hanover (T)	4,500	0.65	Camp Brook (imp.)	None
Harrisville (T)	50	-	Driven well	None
Haverhill (T)	550	0.025	Springs (5)	None
Hinsdale (T)	1,500	0.12	Kilburn Pond and Kilburn Brook	FC
Keene (C)				
—Stone Dam Plant	(14,500 -(	1.20	Roaring Brook	F
—Beech Hill Plant	(			
Lancaster (T)	2,200	0.220	Garland Brook	D
Lebanon (T)	5,500	0.47	Mascoma River	DF[illegible]

Table 9—Census of Public Water Supplies,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Lisbon (T)	1,200	0.12	Pearl Lake	D
Littleton (T)	5,000	0.70	Gale River	D
Lyme (T)	200	0.070	Springs (3)	None
Marlborough (T)	500	0.05	Well	None
Meriden (V) (Plainfield T)	400	0.006	Newton Brook	D
Newport (T)	4,000	0.50	Gilman Pond	None
No. Charlestown (V) (Charlestown T)	75	-	Brooks	None
North Haverhill (V) (Haverhill T)	286	0.003	Springs (4)	None
N. Stratford (V) (Stratford T)	700	-	Kimball Brook	None
Northumberland (T)	120	0.05	Spring	None
N. Walpole (V) (Walpole T)	1,200	0.07	Springs (9)	None
Sunapee (T)	1,000	0.08	Sunapee Lake	D
—George's Mill	500	-	Ledge Pond	D
Surry (T)	70	-	Spring	None
Troy (T)	1,100	0.070	Stream	None
Twin Mountain (V) (Carroll T)	300	-	Little River	None
Walpole (T)	500	0.06	Mad Brook	F
West Lebanon (V) (Lebanon T)	450	-	Served by White River Jct., Vermont	D
West Stewartstown (V) (Stewartstown T)	400	-	Served by Canaan, Vt.	None

Table 9—Census of Public Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Whitefield (T)	1,200	0.15	Wells & springs	None
—Mountain View (V)	150	0.01	Spring	None
Woodsville (V) (Haverhill T)	2,000	0.40	Wild Ammonoosuc River	D
Vermont				
Ascutney (V) (Weathersfield T)	50	0.005	Springs	None
Barnet (T)	250	0.025	Springs	None
Beecher Falls (V) (Canaan T)	180	0.48	Gravel packed well	None
Bellows Falls (V)	4,240	0.508	Minand Pond	None
Bethel (T)	700	0.040	Mtn. Brk; Ansel Pond, Springs & gravel packed well	None
Bradford (T)	690	0.15	Springs, brook, gravel packed well	None
Brattleboro (T)	10,985	1.5	Pond & mountain brooks	D
Canaan (T)	475	-	Springs	None
Chelsea (T)	230	-	Springs, brook	None
"	100	-	Springs	None
Chester (T)	1,000	0.025	Springs, brook & gravel packed well	None
Danville (T)	500	-	Springs & mtn. brook	None
East Braintree (V) (Braintree T)	105	-	Brook	None
East Ryegate (Ryegate T)	100	-	Flowing well & spring	None

Table 9--Census of Public Water Supplies,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
Fairlee (T)	400	0.04	Springs & brook	None
Gilman (V) (Lunenburg T)	400	-	Springs	None
Hartford (T)	800	0.379	Springs & wells	None
Ludlow (T)	1,800	-	Springs	None
Lunenburg (T)	120	-	Springs	None
Lyndon (T)	275	-	Mountain brook	D
Lyndon Center (V) (Lyndon T)	-	-	Served by Lyndonville	None
Lyndonville (V) (Lyndon T)	1,825	0.28	Springs, mtn. brook & gravel packed well	None
Newbury (T)	500	0.027	Spring & Sleeper Brk.	None
N. Hartland (V) (Hartland T)	200	-	Springs	None
Norwich (T)	700	0.005	Beaver Meadow Brook	None
Passumpsic (V) (Barnet T)	125	0.0085	Springs	None
Peacham (T)	90	0.009	Springs	None
Proctorsville (V) (Cavindish T)	500	0.040	Gravel packed well	None
Quechee (V) (Hartford T)	210	0.250	Deep well	None
Randolph (T)	2,000	0.250	Well, spring	None
Randolph Center (V) (Randolph T)	100	-	Springs	None
Readsboro (T)	700	-	How's Pond	None
Rochester (T)	500	0.011	Springs, inf. basin	None

Table 9—Census of Public Water Supplies,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Served	Average Output M.G.D.	Source of Supply	Treatment 2/
St. Johnsbury (V)	7,435	1.75	Stiles Pond & gravel packed well	F
St. Johnsbury Center (V) (St. Johnsbury T)	190	-	Springs	None
S. Royalton (V) (Royalton T)	325	-	Springs	None
Springfield (V)	5,200	0.60	Well field (drilled); Impounded springs; Mountain brook	D D None
Thetford (T)	135	-	Springs	None
Wells River (V) (Newbury T)	550	-	Wells	None
W. Burke (V) (Burke T)	290	-	Springs	None
Westminster (T)	165	-	Spring	None
White River Jct. (V) (Hartford T)	2,185	0.30	Springs, mtn. brooks & gravel packed well	D
West Woodstock (V) (Woodstock T)	-	-	Served by Woodstock	D
Wilder (V) (Hartford T)	-	-	Served by White River Jct.	D
Wilmington (T)	600	-	Springs	None
Windsor (V)	3,500	0.50	Springs & gravel packed wells (2)	None
Woodstock (V)	1,300	0.355	Springs & mtn. brook	D
TOTAL	1,134,251	124.435		

1/ T - Town; V - Village; C - City; F.D. - Fire District; W.D. - Water District

2/ D - Disinfection; F - Filtration; C - Chemical treatment for corrosion control

There are 14 public institutions in the Connecticut Basin served by water supplies. A total of 4,695 persons residing or employed in seven institutions are supplied by three public water supply systems. Another 6,560 persons in seven institutions are served by institutional water supplies derived mainly from ground water sources. All of the supplies serving institutions are approved by the State health departments and none has any reported water supply problems. The average daily water consumption by institutions is estimated to be 1,500,000 gallons.

Table 10, below, is a census of water supplies serving public institutions in the Connecticut River Basin.

Table 10—Census of Public Institutional Water Supplies, Connecticut River Basin, 1951

Institution	Population Served	Source of Supply	Treatment 1/
Connecticut			
Bloomfield - St. Thomas Seminary	400	Hartford	FC
Enfield - Osborn Prison Farm	250	Wells	D
Middletown - State Hospital	4,000	Reservoirs	D
Newington - Home for Crippled Children	210	Hartford	FC
" - State Sanitarium	570	"	FC
" - U.S. Veterans' Hosp.	475	"	FC
Rocky Hill - Veterans' Home	800	"	F
Massachusetts			
Belchertown - State School	1,510	Driven wells	C
Monson - State Hospital	1,850	Monson	D
Northampton - Hampshire County Sanitarium	120	Dug well; infiltration gallery	None
Templeton - Hospital Cottages	195	(Tubular wells) ( )	None
" - Fernald State School	310	(and brook)	
Westfield - State Sanitarium	390	Westfield	D

Table 10--Census of Public Institutional Water Supplies, Connecticut River Basin, 1951 (Cont'd.)

Institution	Population Served	Source of Supply	Treatment 1/
Vermont			
Putney - Putney School	175	Wells	None
TOTAL	11, 255		

1/ D - Disinfection; C - Chemical treatment for corrosion control; F - Filtration

Persons not residing in communities served by public water supply systems are served in most instances by privately-owned shallow wells or springs. The quality of shallow ground waters is generally good although more highly mineralized than surface waters. Occasionally excessive amounts of iron are encountered. The shallow ground waters in the northern half of the basin tend to be harder than in the southern half. An estimated 396,000 persons residing on farms or in small villages are dependent on privately-owned ground water supplies. Additional thousands of summer visitors are similarly supplied in the recreational areas by wells or springs owned by resort hotels, lodges, and camps. Most of the latter supplies are subject to inspection and approval by the State health departments.

Probably the largest deficiency in inventorying the water resources of the basin for all purposes lies in the dearth of information on the quantities and qualities available, particularly of ground waters. While the basin enjoys a normal rainfall, rather evenly distributed over the year, and gaging stations are maintained to measure run-off, there is not sufficient information to properly evaluate the water resources. There are definite indications of increasing demands on the water resources by municipalities, industry, agriculture and recreation interests. Most of the uses by these groups are in conflict with one another. A systematic collection of quantitative data on the amount and quality of the water resources and a correlation of their use is needed.

Industrial Water Supply

There is little quantitative information on use of water by industry in the Connecticut River Basin. Many of the larger and more important industries in the basin have "wet-processes" and water is a vital natural resource. Most of these manufacturing plants are dependent on the available surface waters and others, by choice or necessity, either purchase water from municipal supplies or have developed industrial wells. In a number of instances, manufacturing establishments utilize all, or combinations of, public supplies, industrial wells and available surface waters to obtain process waters of adequate quantity and suitable quality.

There is too little information to make an accurate estimate of the volume of water used by industry. The per capita consumption of water from public supplies indicates that as much as 30 percent of the daily pumpage may be purchased by industry and this would amount to about 37 million gallons. Probably several times this amount is used by industries dependent on streams and other surface waters, much of which must be treated before use. An appreciable quantity of water is supplied by industrial wells and this development has been most concentrated in the Hartford and Springfield industrial areas. In most well-developed river basins in New England, the industrial water consumption generally considerably exceeds the public water supply pumpage. On this basis, the industrial use of water in the Connecticut River Basin would be greater than 125 million gallons per day, and during periods of peak production probably exceeds 200 million gallons per day.

At the present time the largest use of water is by the paper, textile and metal processing industries. The continued industrial growth of the Connecticut River Basin is indicated and this will create additional demands on the water resources as most modern industries utilize water-consuming manufacturing processes. The economic core of the basin lies in the continued industrial development and much of the future industrial growth will be dependent on the quality and quantity of the water resources available for this purpose. Although the water resources are considerable, their use by industry to transport process wastes is in conflict with its own needs for process waters, as well as in conflict with other legitimate uses.

Before an accurate and intelligent discussion of the present and future water use by industry in the Connecticut River Basin can be made, a systematic inventory of the quantity and quality of the water resources available needs to be made and this to be correlated with the needs of industry and other water users.

Recreation

The recreation industry is fast becoming the second largest source of income in the basin and the use of the water resources for this purpose is diverse and widespread. Bathing, game fishing, boating and yachting are the most important uses for this purpose. The water resources are also important in the maintenance of wildlife for recreational hunting. In addition to the importance of recreation as an industry, the water resources serve as a recreational outlet for large numbers of the permanent population.

The recreation industry is the most rapidly-growing industry in the basin and the use of the water resources for all types of water recreation is increasing steadily. A large share of the recreational development has been by private interests. Long stretches of lakesides and streams have been pre-empted or leased for commercial development, for private summer or vacation residences and for use by private hunting and fishing clubs.

The practice of private recreational development has created a shortage of water resources for public development. In some portions of the basin the practice of setting aside sizable lakes and ponds for public water supplies has further added to the shortage of recreational waters. Pollution of watercourses by sewage and industrial wastes also restricts the numbers of recreational waters presently available.

To provide for the need and demand for more public recreational areas the States have provided more than forty State parks and forests. Most of these have been developed for camping, picnicking and hiking; more than half have been developed for fishing; and a very few have been developed for recreational bathing. Small portions of the Green and White Mountain National Forests lie within the basin but are principally of use for the wilderness recreations of camping and hiking. To further provide public fishing waters, the States have entered into agreements with landowners whereby the use of gamefishing waters by the public is regulated by the State. Many of these regulated fishing waters are already subjected to heavy pressure from many man hours of fishing.

A definite need for additional public recreational areas, especially those providing gamefishing and bathing opportunities, is generally expressed by the park and recreation agencies of the various States. At the present time the States of Massachusetts, Vermont and New Hampshire are studying the feasibility of developing various of the reservoir areas of the Corps of Engineers for recreational purposes. A further opportunity for recreational water development may be afforded at proposed multiple-purpose reservoirs if storage pools are provided. There is a growing demand to develop restricted public water supply watersheds and reservoirs for compatible recreational uses.

All of the States have programs for the encouragement of the recreation industry. The basin contains all of the physical features necessary to outdoor recreation and this industry should continue in its rapid growth of recent years. The increase in demand for public recreational facilities and the growth of the private recreation industry is fixing an ever-increasing burden on the water resources. A great deal of the water resources are available for this purpose if conflicts with other uses can be resolved. The use of the water resources for recreational purposes has assumed a position of wide use and vital importance to the welfare and well-being of the basin.

Livestock Watering

Livestock watering is an essential use of the water resources of the Connecticut River Basin. The farm animal population is relatively high and almost half the cleared farmland is in pasture. Animals are in pasture a large part of the year and dependent on available surface waters for water supply. More than 75 percent of the farm income is derived from the sale of livestock and livestock products, nearly half being dairy products. Since these products represent such a large proportion of the total farm revenue, the availability of adequate sources of reasonably clear and palatable water for livestock watering assumes appreciable importance.

Irrigation

Irrigation is not a widespread use of the water resources but in recent years has become of increasing importance in the lower parts of the basin. Research has clearly demonstrated the desirability of irrigation of certain crops during critical periods of growth and that this practice produces larger crops of higher quality. The acreage irrigated and the volume and source of waters used for this purpose is not available. Irrigation practice is being advised by State and Federal agricultural agencies and the use of the water resources for this purpose will undoubtedly become greater as irrigation structures and equipment are made available. Most of the water needed for supplemental irrigation can be supplied through the development of wells and impounded farm water supplies and the remainder will need to be taken from available streams.

Increased irrigation practices may require appreciable volumes of water over short periods of time, usually during dry periods when run-offs are generally lower, although drouths are generally of short duration. The use of the surface water resources for this purpose would be somewhat in conflict with other normal downstream uses and some upstream uses, particularly transportation of sewage, may interfere with irrigation practices. The quantity and quality of waters available and required for irrigation need to be determined and correlated with other normal and desired stream uses.

Commercial Fishing

Many years ago the Connecticut River was one of the country's leading inland commercial fishing areas. The river was renowned for its tremendous salmon, shad and alewife runs. The construction of dams at Turners Falls, Massachusetts, in 1798 and at Holyoke, Massachusetts, in 1849 proved to be impassable barriers and the fish runs dwindled almost to extinction. Pollution probably aided in the elimination of shad and salmon below the Holyoke dam.

In recent years sport hatcheries for shad have been established at Enfield Rapids, Connecticut, and Holyoke, Massachusetts. Some pollution control measures have been instituted. As a result, shad have been returning to the river in over-increasing numbers and today are of growing economic significance. The Connecticut State Board of Fisheries and Game estimated that more than a million pounds of shad, valued at over $162,000, were caught in commercial nets during 1946. Also in recent years, the large alewife run has been re-exploited. Eels, carp, suckers and sometimes other fish are taken commercially below Hartford.

The Connecticut River and its tributaries represent a tremendous resource in its warm and cold-water gamefish population. Although probably more properly associated with recreation, the water resources provide thousands of hours of sport fishing that produce a very appreciable income from the sale of sporting equipment, transportation, accommodations, etc.

Shellfish Propagation

The use of the waters of the Connecticut River for shellfish propagation is of very minor significance commercially. Dredging operations, a lack of natural oyster beds, and more profitable operations to the west of the basin have precluded the development of an oyster industry, at least until a greater market has been established. Some clams and other mussels are taken by individuals, largely for consumption at home.

Wildlife Habitat

The importance and use of the water resources to wildlife in the basin is largely in the relation between sports hunting and recreation. The relationship of upland game to the water resources is indirect. Improved forest and land management practices, designed partly to conserve moisture and run-off, should increase the wild animal population by providing a mixed vegetation for improved food supply and cover.

Waterfowl management and development are directly related to the water resources. There is a relative lack of migratory waterfowl in the basin because the area includes few extensive marshy, shallow areas necessary to attract and support large populations of waterfowl. Nevertheless, the annual harvest of waterfowl is rather impressive, largely through the practice of jump shooting employed by hunters. Waterfowl hunting is mostly confined to the lower basin in Connecticut and, in addition to private hunting preserves, the State has established two regulated areas near Lords Cove and Great Island.

Waterfowl hunting is popular where these facilities are available. Large areas of water resources would need to be developed to increase migratory waterfowl concentrations. Land drainage programs in some areas would reduce the already limited opportunities in this sport and impoundments of water for various purposes would tend to increase waterfowl populations.

Navigation

The Connecticut River is navigable to the dam at Holyoke, Massachusetts, a distance of 86 miles, but commercial navigation is confined at present to the 52 miles between the mouth of the river and Hartford, Connecticut. The Corps of Engineers, Department of the Army, has made extensive channel improvements below Hartford in recent years and others are proposed.

River shipping has been mainly confined to coal, petroleum products and other bulk commodities, amounting to 1,800,000 tons in 1949 and is expected to have exceeded two million tons in 1950. A high cost of rail and highway transportation affects the cost of raw materials, fuel, steam-electric power and consumer goods. The availability of cheaper water transportation to or near the larger centers of population and industry may prove of increasing importance to the present and future basin economy.

The growth of communities above Hartford indicates that extension of commercial navigation to Holyoke may be desirable. This would require channel improvements above Hartford and commercial navigation below Hartford would be more economical if further channel improvements were made. It is doubtful if navigation could be profitably extended above Holyoke for many years.

There is an extensive use of the navigable portion of the river for pleasure craft and there are no less than six yacht clubs located between the mouth and Hartford.

Hydroelectric Power Development

In comparison with some of the other large river basins in the United States, the hydroelectric power potentiality of the Connecticut Basin is well developed, although some plants are obsolete and some sites underdeveloped. The installed capacity of 50 kilowatts of hydroelectric power per square mile, however, is inadequate to meet the requirements of the area. To meet the power demands of the region, the Connecticut River Basin has become a subdivision in a generally integrated power region.

Many power studies have been made by private, State and Federal interests. Not all of the fall in the river and its tributaries has been developed but the economics of further developments is somewhat in controversy. To increase power development, improvements are under way at the Holyoke Dam and at Wilder, Vermont. Applications for new hydroelectric developments at Enfield Rapids, Connecticut, and at Upper Fifteen-Mile Falls, near Littleton, New Hampshire, have been made to the Federal Power Commission. A bill is now before the Vermont legislature which would authorize the Public Service Commission to build and develop hydro and firm electric power sources and to buy, sell and transmit electric power.

The future development of hydroelectric power in the Connecticut River Basin appears to depend on the development of upstream storage projects to regulate stream flow, redevelopment of existing installations to increase capacities, combination of existing smaller installations into one large project where this is possible, and new developments where the potentialities exist or can be made to exist by multiple-purpose projects. Conflicts on hydroelectric power development are proposed to be resolved by studies being made, or to be made, by private, State and Federal interests, independently or cooperatively, or both.

The existing installed hydroelectric generating capacity is 550,000 kilowatts. There is a total of 64 public utility hydroelectric plants having a total installed capacity of 485,000 kilowatts. There are 226 industrial water power developments, many of which are very small. Industrial hydroelectric developments have an installed capacity of 46,000 kilowatts and mechanical water power installations have an equivalent of 19,000 kilowatts of hydroelectric power.

Beginning with the first sawmills and gristmills, early in the eighteenth century, the power potentiality of the water resources has been of prime importance to the economy of the Connecticut Basin. The large-scale manufacturing that has developed was originally made possible by the available hydro-power. The subject of hydroelectric power development has long been a subject of investigation and study and this is an excellent indication of the importance of this water use, not only to the economy of the basin but to the New England region as well.

Transportation of Wastes

For many centuries water, the universal solvent, has been in use by mankind for the disposal of wastes. The water resources of the Connecticut River Basin were undoubtedly put to this use even by the Indians. Following the settlements by the English, and as the population and industry grew, the water resources were called upon to carry away ever-increasing amounts of wastes. Today, the water resources transport millions of gallons of sewage and industrial wastes daily.

In such a highly populated and industrialized region the use of the water resources as the final place of disposal for all waterborne wastes is indispensable. However, the discharge of large volumes of untreated wastes in some areas has become incompatible with other normal and desired water uses.

Part 10

POLLUTION CONTRIBUTED TO WATER RESOURCES

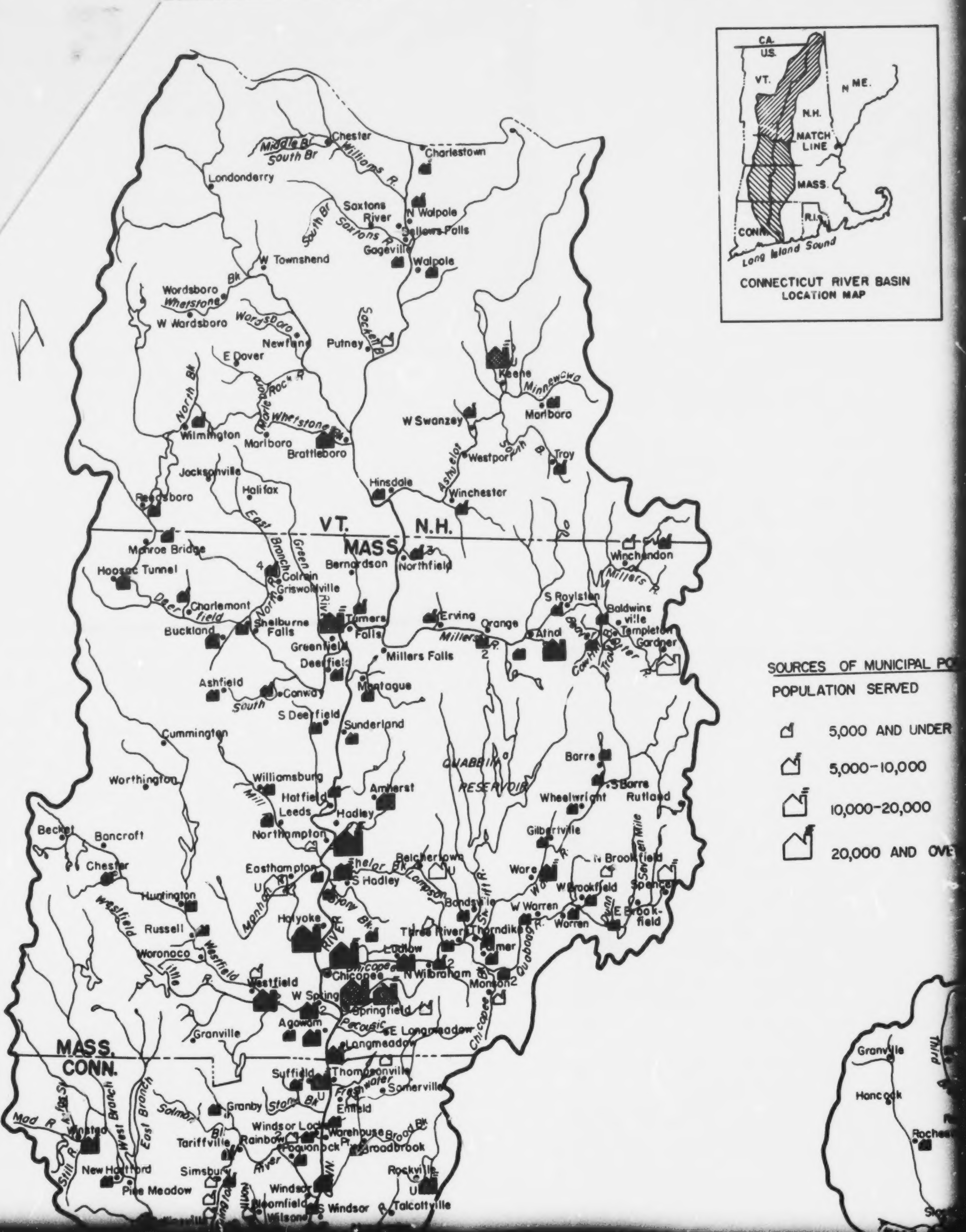
General

The Connecticut River system is subjected to a large amount of pollution, both organic and inorganic. The main stem of the river transports the largest proportion of the total pollution, particularly in the stretch from Northampton, Massachusetts, to Long Island Sound. All of the 23 principal tributaries of the Connecticut River receive pollution, many transporting large volumes of wastes. Fourteen of the lesser tributaries of the Connecticut River also receive significant amounts of pollution.

The greatest amounts of organic waste pollution result from the discharge of large volumes of municipal sewage and wastes from the paper, textile and dairy industries. The metal processing and machine industries contribute most to inorganic pollution by the discharge of degreasing, pickling, grinding, plating and finishing wastes. Other appreciable organic wastes are contributed by food processing plants, chemical manufacturing, tanneries, and laundries. Additional amounts of inorganic wastes are contributed by abrasives from machinery and tool manufacturing, foundry wastes, and sand and gravel washing wastes. There is a considerable amount of sawdust and wood chips discharged to watercourses in Vermont by sawmills and wood processing plants. Although organic in composition, the effects of these wastes are more akin to floating and settleable inorganic solids than to putrescible organic materials. The same is true of the appreciable oil pollution from metal processing plants, bulk plants and garages.

Rather extensive surveys of some of the principal tributaries have been made in the past and some have been completed recently. Many of the major sources of pollution have been measured and almost all of the existing sources have been located and the type of wastes discharged determined. There are still many gaps in the available information, however, and additional surveys and investigations are needed to gather together all of the data required to formulate a comprehensive water pollution control program. In particular, data are needed on the volume and strengths of wastes and their effects on receiving streams.

Table 11 is a summary of all known or suspected sources of pollution and Figures 3 and 4, show the approximate locations and distribution in the Connecticut River Basin.


CONNECTICUT RIVER BASIN
LOCATION MAP
CA.
U.S.
VT.
N.H.
ME.
MATCH LINE
MASS.
CONN.
R.I.
Long Island Sound
SOURCES OF MUNICIPAL PO
POPULATION SERVED
5,000 AND UNDER
5,000-10,000
10,000-20,000
20,000 AND OVE
VT.
N.H.
MASS
MASS.
CONN.
Chester
Middle Br
South Br
Williams R.
Charlestown
Londonderry
Saxtons River
N Walpole
South Br
Saxtons R.
Bellows Falls
Gageville
Walpole
W Townshend
Wordsboro
Wardsboro Bk
Whetstone
W Wardsboro
Wardsboro
Newfane
Putney
Sacketts B
E Dover
Rock R.
North Bk
Whetstone Bk
Wilmington
Marlboro
Brattleboro
Keene
Minnewawa
Marlboro
W Swanzey
Ashuelot
South B
Westport
Troy
Jacksonville
Halifax
Readsboro
Hinsdale
Winchester
East Branch
Green
Monroe Bridge
Hoosac Tunnel
Colrain
Griswoldville
Bernardston
Northfield
Winchendon
Millers R.
S Royalston
Baldwinsville
Templeton
Gardner
Athol
Orange
Erving
Millers R.
Deerfield
Charlemont
Buckland
Shelburne Falls
North R.
Turners Falls
Greenfield
Deerfield
Millers Falls
Ashfield
Conway
South
Montague
S Deerfield
Sunderland
Cummington
QUABBIN RESERVOIR
Barre
S Barre
Rutland
Worthington
Williamsburg
Mill
Hatfield
Leeds
Amherst
Hadley
Wheelwright
Northampton
Gilbertville
Becket
Bancroft
Chester
Belchertown
Ware
N Brookfield
Seven Mile
Easthampton
S Hadley
Manhan R.
Jabish Bk
Swift R.
Ware R.
W Brookfield
Spencer
Huntington
Westfield
Stony Bk
Bondsville
W Warren
Warren
E Brookfield
Holyoke
Russell
RIVER
Three Rivers
Thorndike
Palmer
Woronoco
Little R.
Westfield
Ludlow
Chicopee
Chicopee
N Wilbraham
Monson
Quaboag R.
Westfield
W Springfield
Springfield
Chicopee
Agawam
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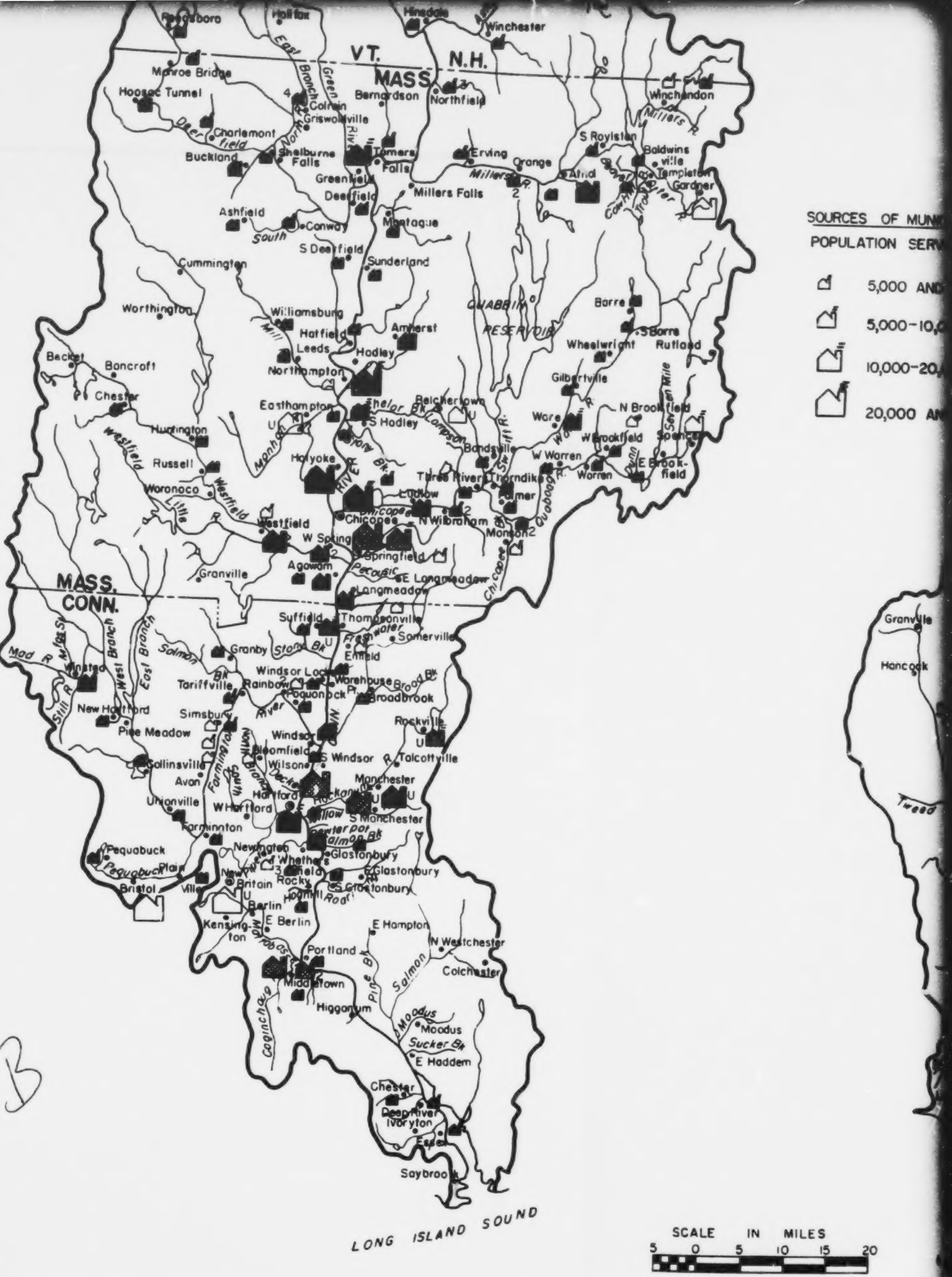
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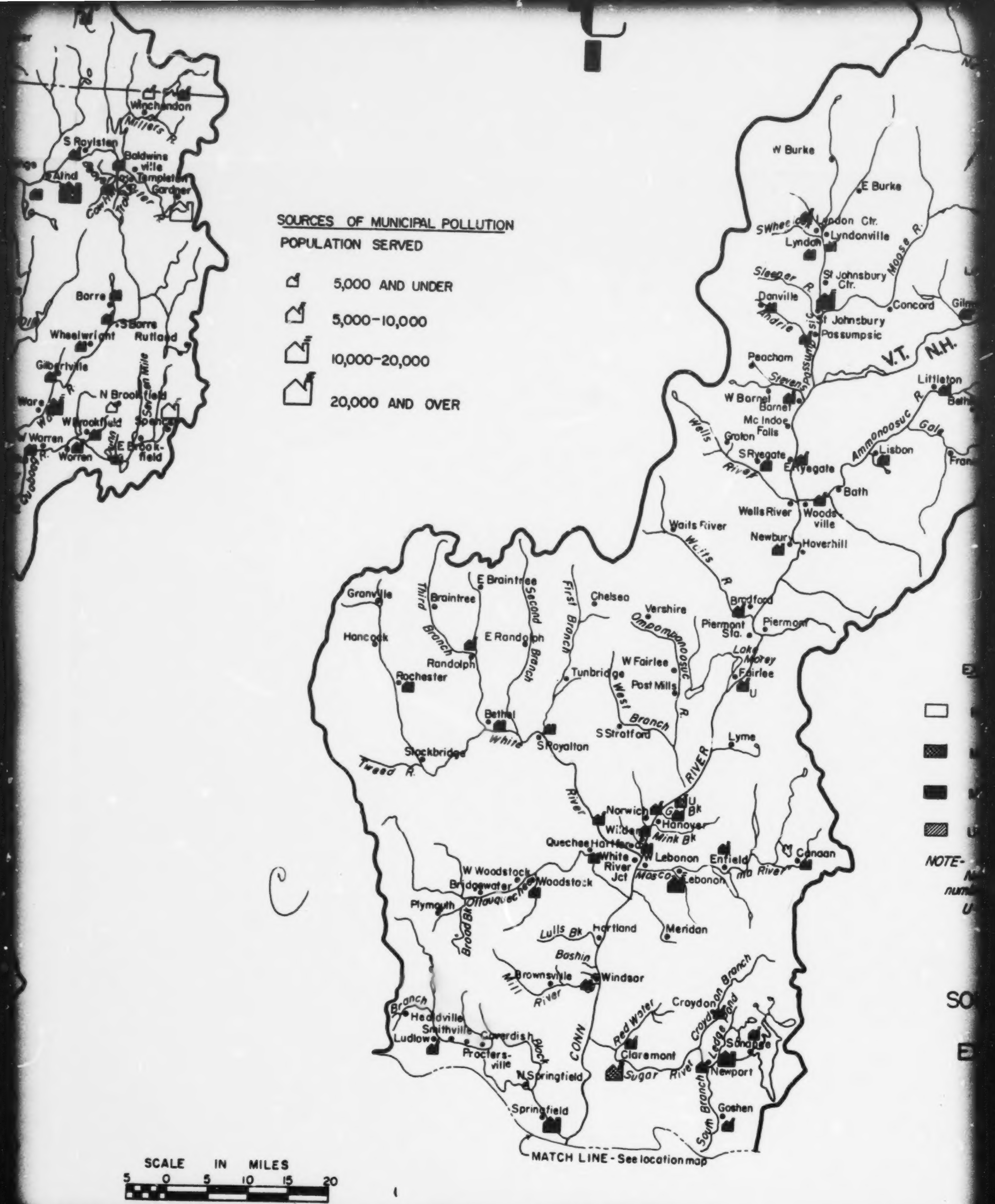
SOURCES OF MUNICIPAL POLLUTION
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SCALE IN MILES
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Lulls Bk
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Windsor
Mill River
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Croydon Branch
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Healdville
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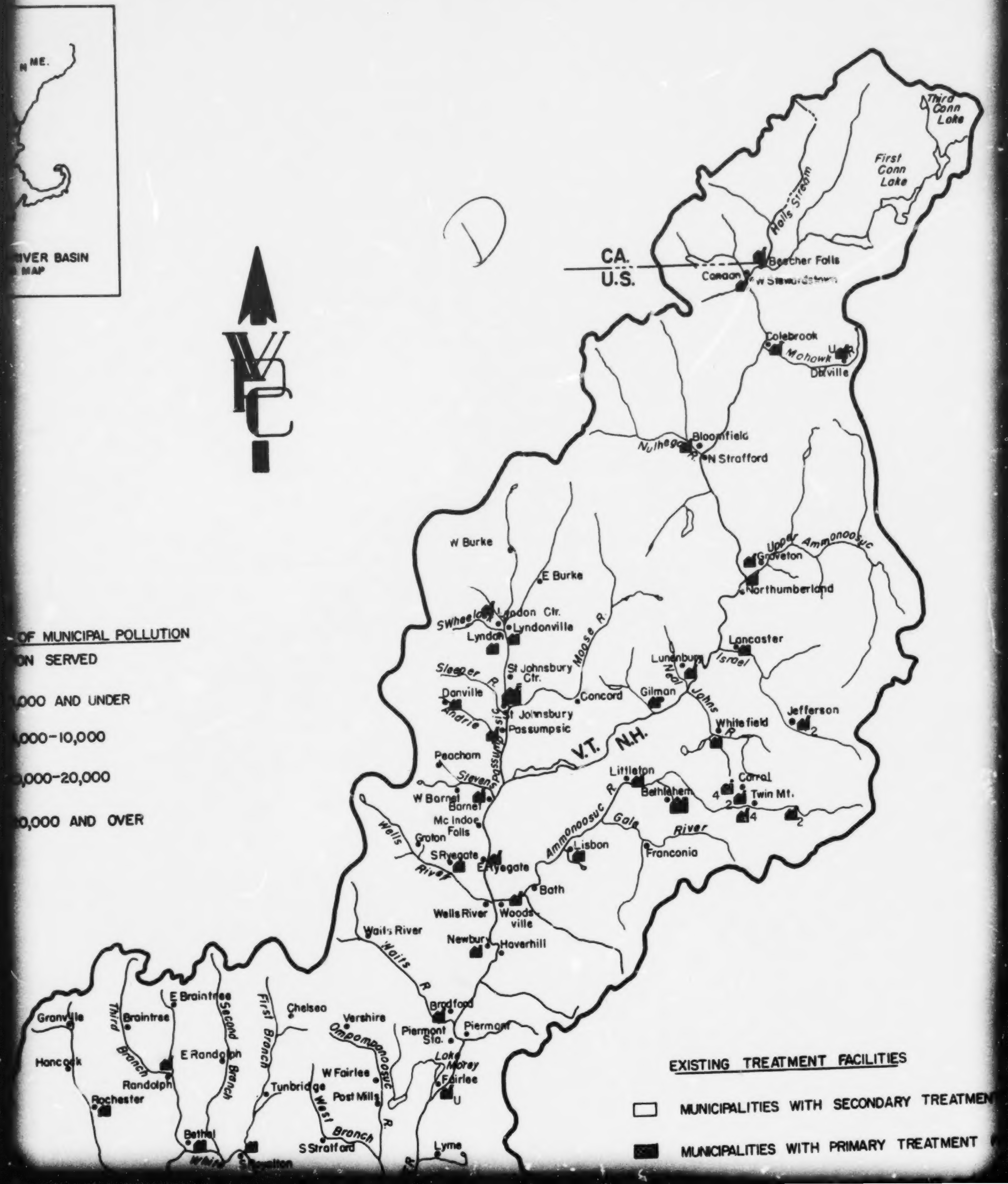
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Rochester
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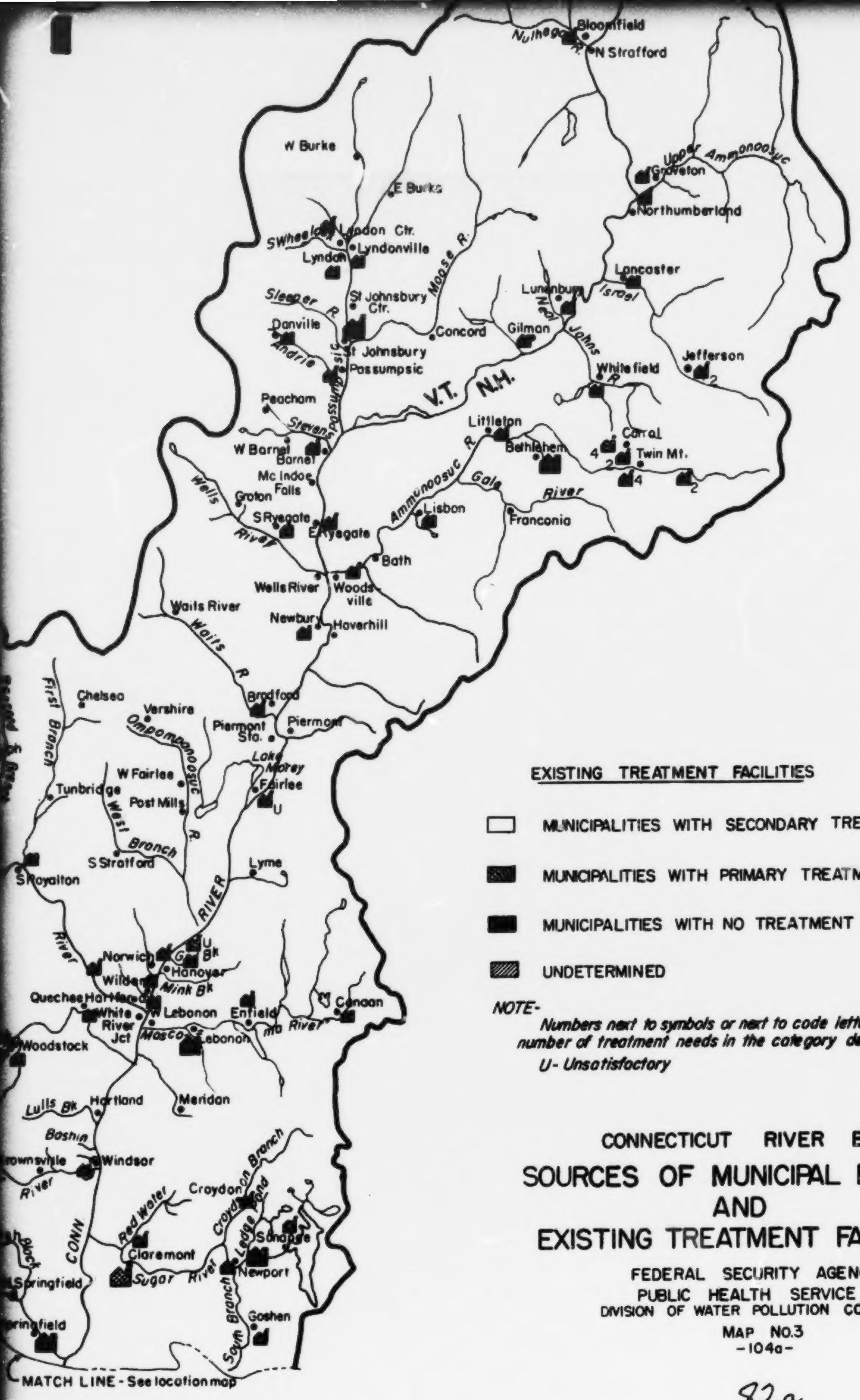
Lyme
EXISTING TREATMENT FACILITIES
☐ MUNICIPALITIES WITH SECONDARY TREATMEN
■ MUNICIPALITIES WITH PRIMARY TREATMENT

D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Croydon Branch
Red Water
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Sunapee
Newport
Sugar River
Springfield
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Goshen
Springfield
MATCH LINE - See location map

EXISTING TREATMENT FACILITIES

☐ MUNICIPALITIES WITH SECONDARY TREATMENT FACILITIES

▩ MUNICIPALITIES WITH PRIMARY TREATMENT FACILITIES

■ MUNICIPALITIES WITH NO TREATMENT FACILITIES

▨ UNDETERMINED

NOTE-
Numbers next to symbols or next to code letters represent number of treatment needs in the category designated.
U- Unsatisfactory

CONNECTICUT RIVER BASIN

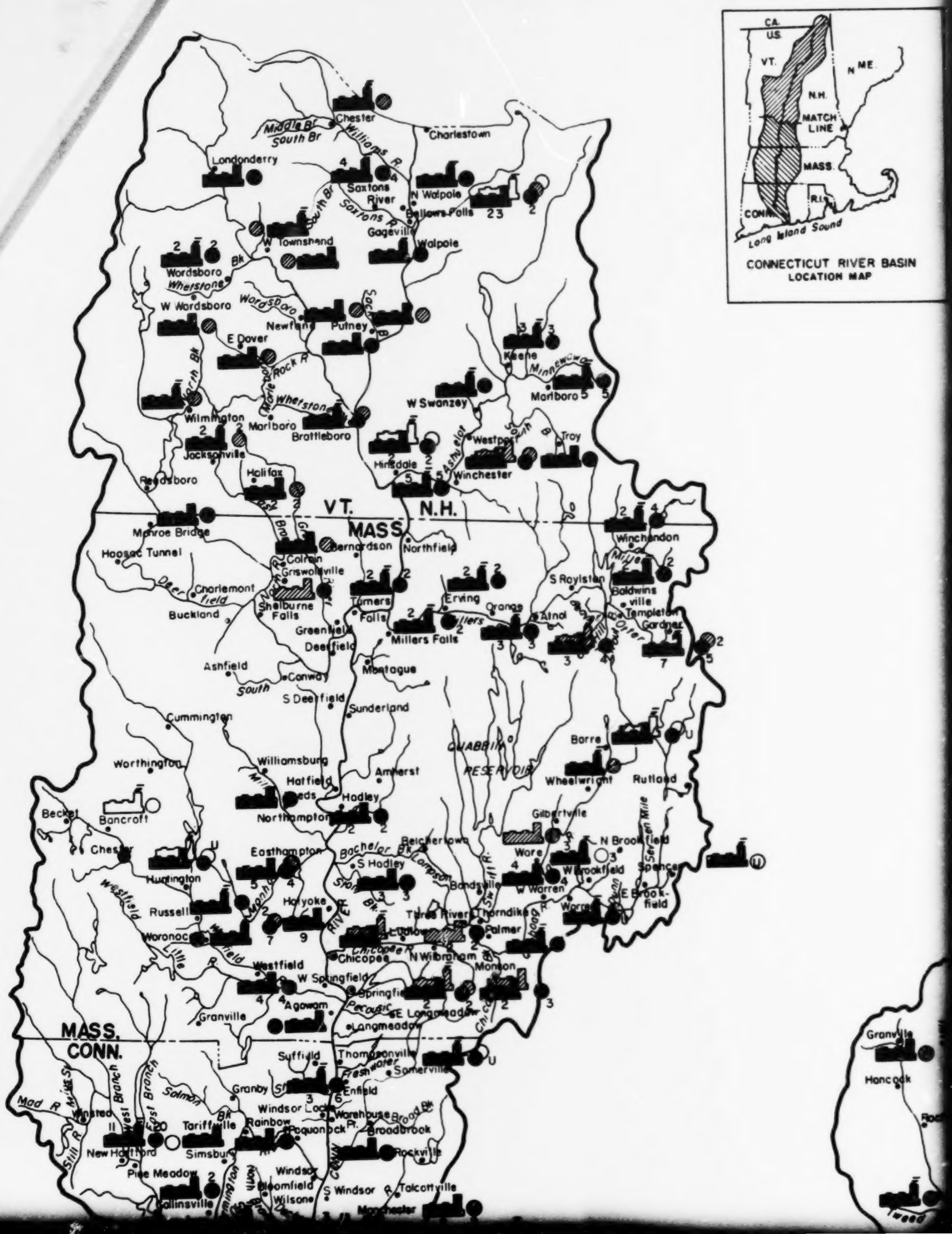
SOURCES OF MUNICIPAL POLLUTION AND EXISTING TREATMENT FACILITIES

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL

MAP NO.3
-104a-

82a

A


CONNECTICUT RIVER BASIN
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Rock R
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Stony Bk
Belchertown
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Warehouse Pt.
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Poquonock
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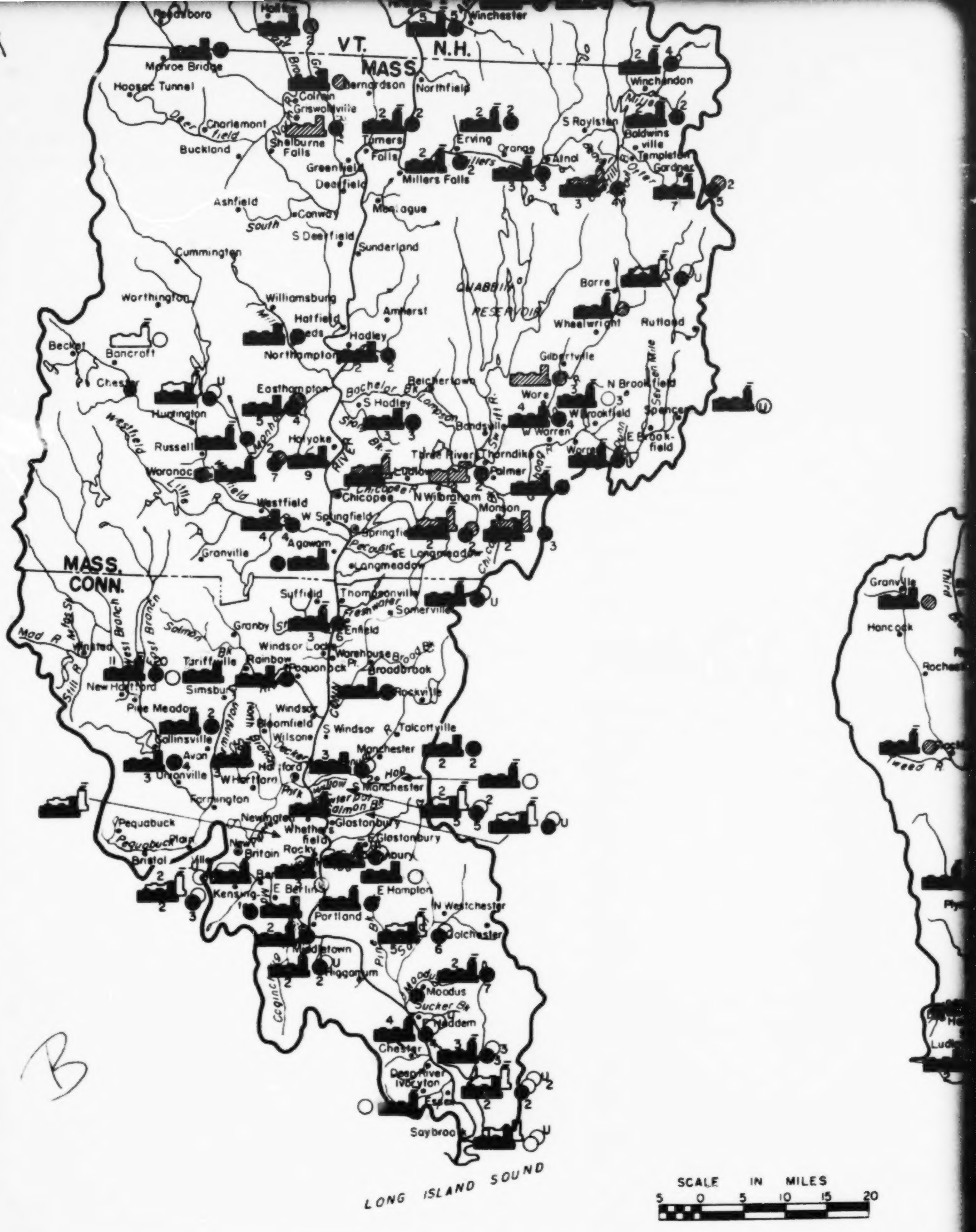
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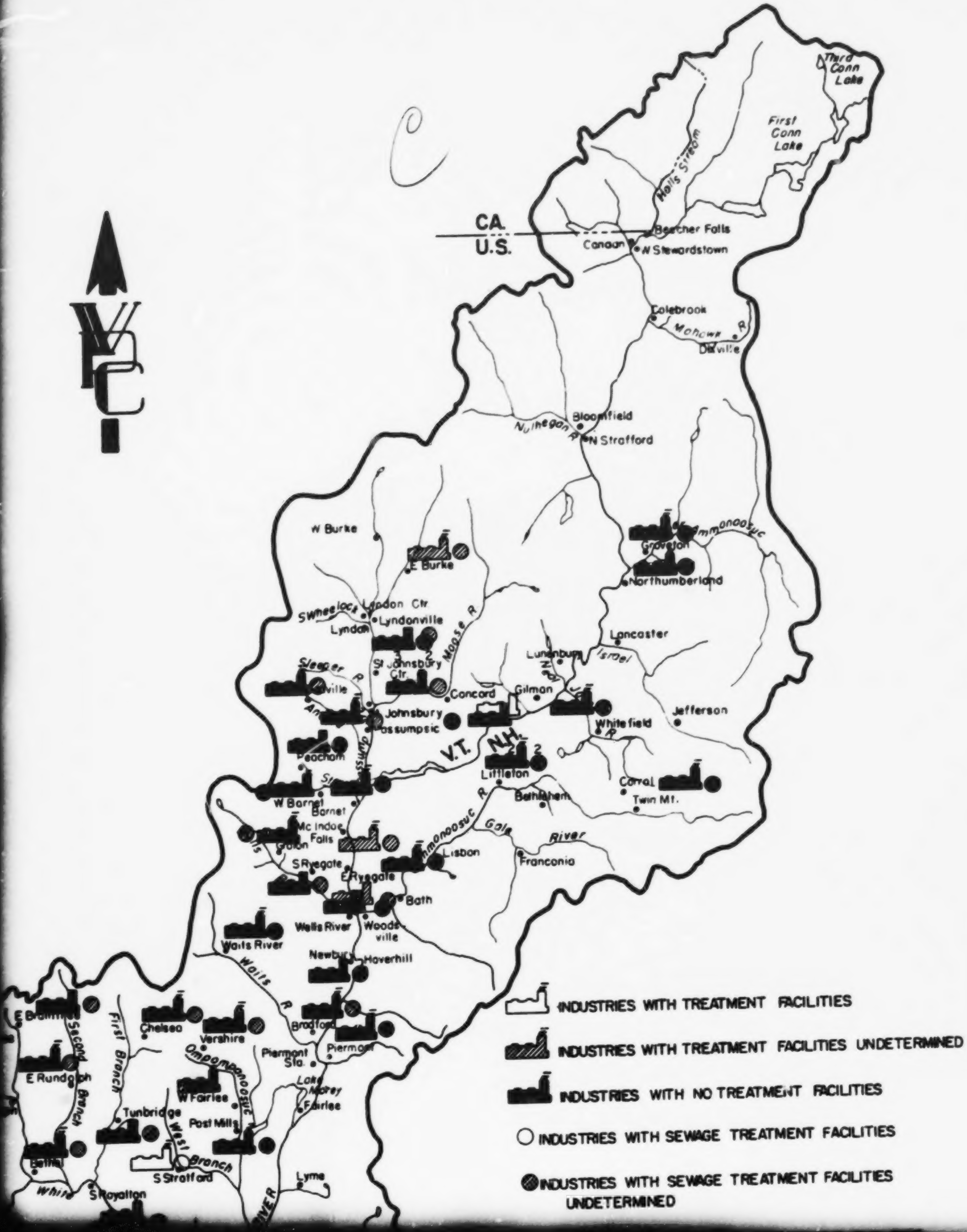
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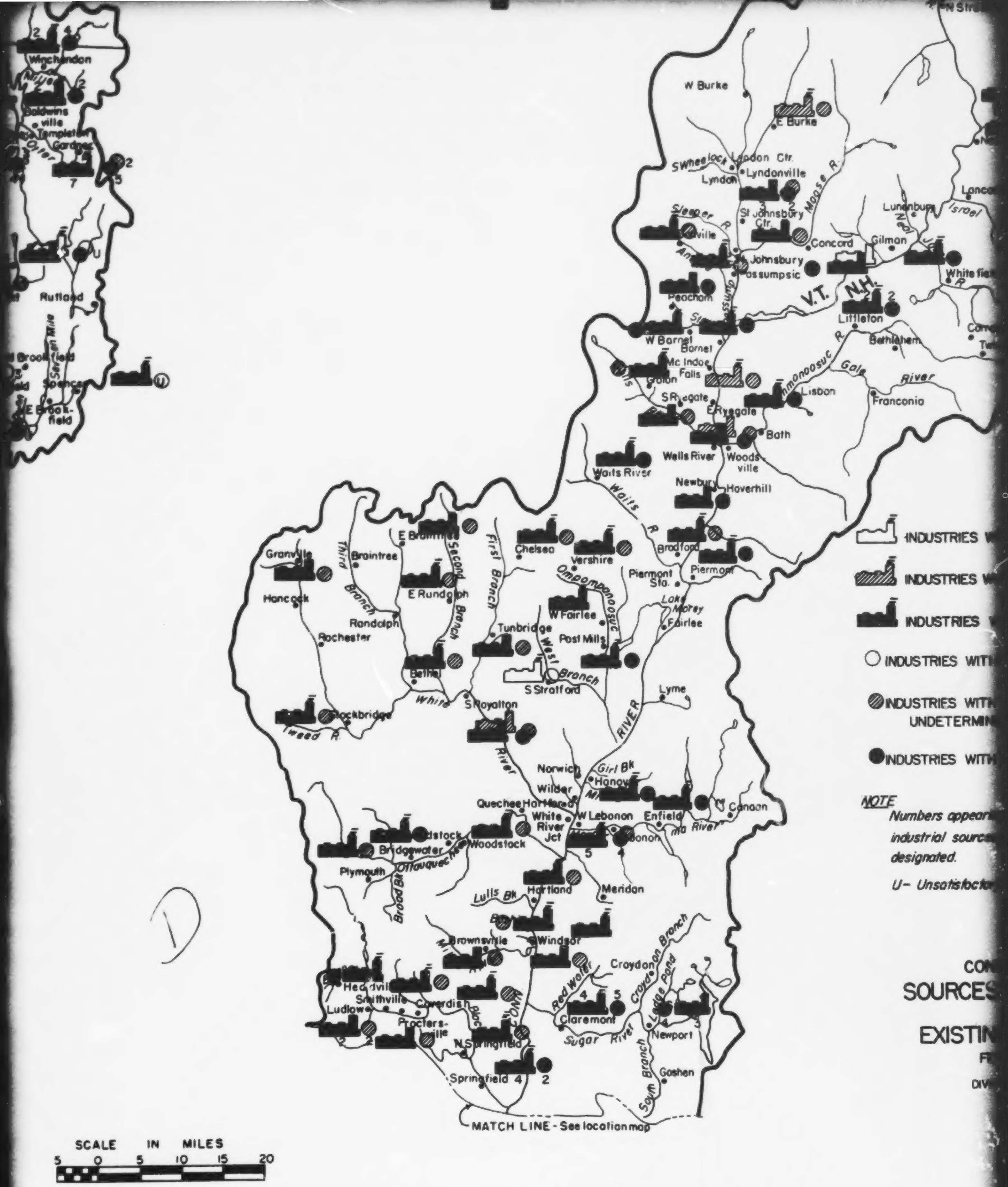
INDUSTRIES WITH TREATMENT FACILITIES
INDUSTRIES WITH TREATMENT FACILITIES UNDETERMINED
INDUSTRIES WITH NO TREATMENT FACILITIES
INDUSTRIES WITH SEWAGE TREATMENT FACILITIES
INDUSTRIES WITH SEWAGE TREATMENT FACILITIES UNDETERMINED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Meridan
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Croydon
Croydon Branch
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Smithville
Cavendish
Proctersville
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Red Water
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Sugar River
Newport
Ledge Pond
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Springfield
Goshen
South Branch
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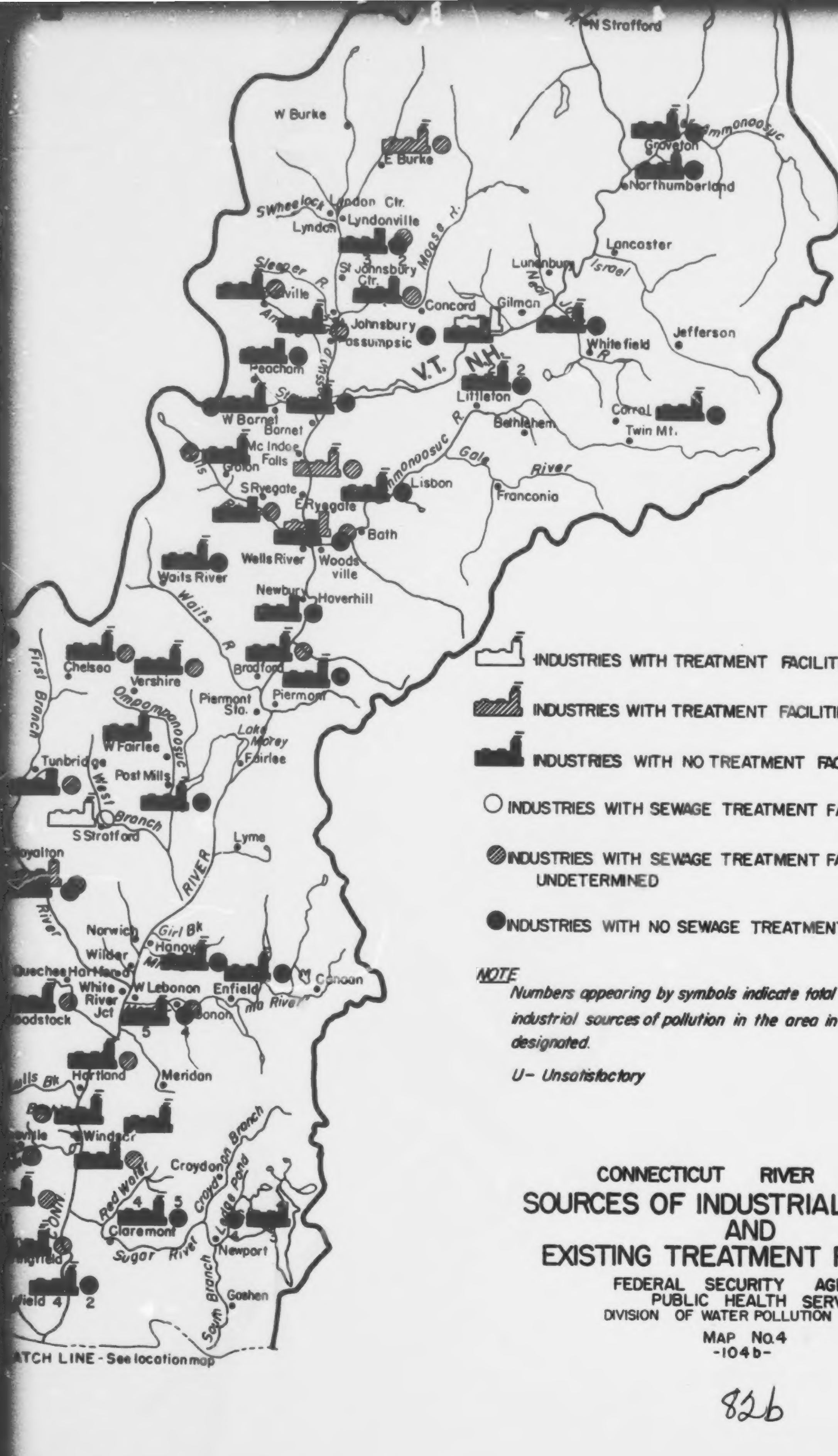
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- INDUSTRIES WITH TREATMENT FACILITIES
- ▨ INDUSTRIES WITH TREATMENT FACILITIES UNDETERMINED
- ■ INDUSTRIES WITH NO TREATMENT FACILITIES
- ○ INDUSTRIES WITH SEWAGE TREATMENT FACILITIES
- ▨ INDUSTRIES WITH SEWAGE TREATMENT FACILITIES UNDETERMINED
- ● INDUSTRIES WITH NO SEWAGE TREATMENT FACILITIES

NOTE

Numbers appearing by symbols indicate total number of industrial sources of pollution in the area in the category designated.

U- Unsatisfactory

CONNECTICUT RIVER BASIN

SOURCES OF INDUSTRIAL POLLUTION AND EXISTING TREATMENT FACILITIES

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL

MAP No.4

Table 11—Summary of Number and Status of Known or Suspected Sources of Pollution, Connecticut River Basin, 1951

		Without Treatment			With Treatment			
Sources of Pollution	Total	No.	Treatment Needed	Status Not Known	No.	Improvements Needed	Status Not Known	No Project Required
Institutions	19	4	4	0	15	3	0	12
Municipalities 1/	118	83	56	27	35	8	0	27
Villages and Towns (Unsewered) 2/	62	62	56	6	0	0	0	0
Resort Hotels	13	8	8	0	5	5	0	0
Industry (Sewage Only)	58	45	45	0	13	9	0	4
Industry (Wastes Only)	23	21	21	0	2	0	0	2
Industry (Both Sewage and Wastes)	257 3/	241 4/5/	241	0	16	4 6/	6 7/	6 8/
Industry (Undetermined)	17	17	0	17	0	0	0	0

1/ Includes three municipalities which have systems serving part of town but also have sources of pollution from private sewers that are listed under Villages (Unsewered); and four municipalities serving a total of 12 communities.

2/ Includes villages without community systems discharging sewage from 30 persons or more.

3/ Includes 50 plants for which information on sanitary wastes is undetermined.

4/ Includes 10 plants providing satisfactory treatment of sanitary wastes.

5/ Includes 13 plants having inadequately treated sanitary wastes.

6/ Includes 2 plants providing unsatisfactory treatment of sanitary wastes.

7/ Includes 1 plant having untreated sanitary wastes and 5 with disposition of sanitary sewage undetermined.

8/ Includes 5 plants providing satisfactory and 1 plant unsatisfactory treatment of sanitary wastes.

Summary of Pollution Contributed by Domestic Sewage

There are 113 communities in the Connecticut River Basin served by 125 public sewerage systems. Eight of these communities are connected to the sewerage systems of four larger municipalities for the treatment or disposal of all or a part of the municipal wastes. Some municipalities are served by more than one sewerage system.

Approximately 983,000 persons, 64.2 percent of the total population, are served by municipal sewerage systems. Twenty-six cities and towns in Connecticut served by 35 sewerage systems, have a contributing population of 439,750; 41 communities in Massachusetts have a connected population of 440,740; the 27 municipal sewerage systems in Vermont serve 40,865 persons; and 61,800 persons in 16 communities in New Hampshire are served by public sewers.

Thirty-seven communities treat municipal sewage in a total of 35 sewage treatment plants, including eight communities served by treatment facilities owned by three other municipalities and one State institution. In some instances municipalities operate more than one sewage treatment facility. Approximately 646,000 persons, or 65.7 percent of the sewered municipal population, are served by sewage treatment plants and of these 497,500 persons are served by adequate treatment facilities and 148,500 others are served by unsatisfactory sewage treatment works. The domestic sewage from 337,000 persons residing in 76 sewered municipalities is discharged to watercourses without treatment.

Another substantial source of pollution is represented by the domestic sewage from persons residing in villages and towns not served by municipal sewers. In these instances, pollution results from private sewers, septic tank outlets and storm water drains. There is a total of 62 such sources of sewage pollution with contributing populations ranging from 30 persons to more than 1,750 persons and which total 21,000 persons.

The discharge of domestic wastes by resort hotels represents a further significant source of pollution in the northern regions of the basin, particularly in New Hampshire. During the summer months, when patronage is normal, 13 resort hotels and inns discharge the domestic sewage from a daily average of 3,870 persons. Five of these resort installations have provided treatment facilities, none of which is satisfactory.

There is not sufficient information on which to accurately calculate the total pollution contributed to watercourses by domestic sources of pollution. In most instances the population equivalent discharged at individual sources has not been measured, in others the sewered population is not accurately known and in still others the effects of industrial wastes intercepted by municipal sewers has not been determined. From the data available, however, it is estimated that the population equivalent of domestic wastes, excluding effects of industrial wastes intercepted, approaches or possibly exceeds 700,000 persons. When the effects of industrial wastes intercepted by municipal sewers have been determined, the present population equivalent of the combined wastes will probably be shown to approach 800,000 persons.

Table 12 lists the known sources of domestic sewage pollution and certain of the data related thereto. The estimated population equivalents are for domestic wastes only. A number of the community sewerage systems also collect industrial wastes and these, in most instances, considerably increase the population equivalents of the municipal wastes. It is estimated that industrial wastes transported by community sewers increase the total population equivalent of municipal sewage in the Connecticut River Basin by more than 10 percent.

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Connecticut				
Avon (T)				
Village Plant	400	Intermittent Sand	Satisfactory	40
Fuse Plant	130	" "	"	15
Bloomfield (T)	1,455	(Served by Hartford)		870
Bristol (C)	25,000	Trickling Filter; Chlorination	Satisfactory	3,500
Broad Brook (V) (East Windsor T)	1,100	Primary, Chlorination	Satisfactory	660
Chester (T)		No Municipal System		590
Collinsville (V) (Canton T)		No Municipal System		100
Deep River (T)		No Municipal System		1,765
East Hartford (T)				
United Homes	300	Septic Tanks	Satisfactory	180

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
East Hartford (T)	19,000	None		19,000
Enfield (T)		(Served by Thompsonville)		
Essex (T)		No Municipal System		1,010
Farmington (T)	1,200	None		1,200
Forestville (V) (Bristol T)		(Served by Bristol)		
Glastonbury (T)		No Municipal System		300
Granby (T)	200	Primary	Satisfactory	120
Hartford (C)*	176,960	Primary	Satisfactory	106,180
Manchester (T) (North)	10,550	Primary	Unsatisfactory	6,000
Manchester (T) (South)	19,200	Primary	Unsatisfactory	14,800
Middletown (C)				
Conn. R. Plant	15,500	Primary	Satisfactory	8,580
Washington St. Plant	2,200	Primary	Satisfactory	1,320
Middletown (T)	1,300	None		1,300
New Britain (C)	73,660	Chemical Precipitation	Unsatisfactory	25,800
New Hartford (T)		No Municipal System		200
Newington (T)	50	Served by Hartford		30
Poquabuck (V) (Plymouth T)		No Municipal System		N

*(Total of 224,300 Served by Metropolitan District)

Table 12--Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Poquonock (V) (Windsor T)		No Municipal System		250
Plainville (T)	250	Septic Tank; Sand Filters	Satisfactory	150
Plainville (T)	1,000	Primary Chlorination	Satisfactory	600
Portland (T)	2,500	None		2,500
Rockville (C)	8,200	Primary	Unsatisfactory	4,900
Rocky Hill (T)	1,100	(Served by Hartford)		660
Drum Hill PH A	650	Septic Tanks	Unsatisfactory	520
Simsbury (T)				
Ensign Bickford Pl.	870	Primary	Satisfactory	600
Sewer Ass'n. Plant	1,100	Natural Sand	Satisfactory	55
S. Glastonbury (V) (Glastonbury T)		No Municipal System		100
Suffield (T)		No Municipal System		N
Tarriffville (F.D.)	600	Primary	Satisfactory	400
Thompsonville (V) (Enfield T)	9,500	Primary	Unsatisfactory	10,800
Unionville (V) (Farmington T)		No Municipal System		100
Warehouse Point (V) (East Windsor T)		No Municipal System		1,000
W. Hartford (T)	41,220	(Served by Hartford)		24,700
Wethersfield (T)	3,055	(Served by Hartford)		1,820
Wethersfield (T)	7,000	Primary	Satisfactory	4,200

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Wilson (V) (Windsor T)		No Municipal System		200
Windsor (T)	5,000	None		5,000
Windsor Locks (T)	3,500	None		3,500
Winsted (C)	6,000	None		6,000
Massachusetts				
Agawam (T)	5,700	None		5,700
Agawam (T)	1,500	None		1,500
Amherst (T)	8,000	Primary	Satisfactory	4,800
Ashfield (T)		No Municipal System		150
Athol (T)	10,000	None		10,000
Athol (T)		No Municipal System		1,485
Barre (T)		No Municipal System		1,000
Belchertown (W.D.) (Belchertown T)		(Served by Belchertown State School)		
Baldwinsville (V) (Templeton T)		No Municipal System		290
Bondsville (V) (Palmer T)	1,000	None		1,000
Brookfield (T)		No Municipal System		50
Buckland (T)		No Municipal System		1,060
Chester (T)		No Municipal System		200
Chicopee (C)	41,950	None		41,950

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Colrain (T)		No Municipal System		70
Charlemont (T)		No Municipal System		500
Conway (T)		No Municipal System		200
Deerfield (T)	1,160	None		1,160
Easthampton (T)	10,315	Intermittent Sand	Unsatisfactory	5,500
—Mt. Tom Section	200	None		200
E. Longmeadow (T)	3,000	Trickling Filter	Satisfactory	450
Erving (T)	300	None		300
Foundry Village (V) (Colrain T)		No Municipal System		60
Gardner (C)	15,000	Trickling Filter	Satisfactory	2,250
Gilbertville (V) (Hardwick T)	400	None		400
Griswoldville (V) (Colrain T)		No Municipal System		80
Greenfield (T)	15,900	Primary	Satisfactory	9,440
Hatfield (T)	2,430	None		2,430
Holyoke (C)	53,750	None		53,750
Hoosac Tunnel (V) (Florida T)		No Municipal System		50
Huntington (T)	1,000	None		1,000
Leeds (V) (Northampton C)		No Municipal System		200
Longmeadow (T)	5,790	None		5,790

Table 12--Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Ludlow (T)	6,500	Primary	Satisfactory	1,800
Monroe Bridge (V) (Monroe T)		No Municipal System		50
Montague (T)	3,180	None		3,180
Munson (T)		No Municipal System		200
Northampton (C)	29,000	None		29,000
No. Brookfield (T)	2,000	Trickling Filter	Satisfactory	500
Northfield (T)		No Municipal System		50
N. Wilbraham (V) (Wilbraham T)		No Municipal System		100
Orange (T)	4,000	None		4,000
Orange (T)		No Municipal System		960
Palmer (T)	500	None		500
Russell (T)	1,000	None		1,000
Shelburne Falls (V) (Shelburne T)	900	None		900
Shattuckville (V) (Colrain T)		No Municipal System		30
S. Barre (V) (Barre T)		No Municipal System		75
S. Deerfield (V) (Deerfield T)	1,800	None		1,800
S. Hadley (T)	500	None		500
S. Hadley Falls (V) (S. Hadley T)	6,860	None		6,860

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
S. Royalston (V) (Royalston T)	150	None		150
Spencer (T)	6,000	Intermittent Sand	Satisfactory	230
Springfield (C)				
Main Plant	133,000	Primary	Satisfactory*	79,800
Indian Orchard Plant	16,000	Primary	Satisfactory*	9,600
Sunderland (T)	N	None		N
Thorndike (V) (Palmer T)	800	None		800
Three Rivers (V) (Palmer T)	1,200	None		1,200
Turners Falls (V) (Montague T)	4,780	None		4,780
Ware (T)	6,000	None		6,000
Warren (T)	100	None		100
W. Brookfield (T)		No Municipal System		50
Westfield (C)	18,790	None		18,790
W. Springfield (T)	9,140	None		9,140
W. Springfield (T)	8,000	None		8,000
W. Warren (V) (Warren T)	50	None		50
Wheelwright (V) (Hardwick T)	100	None		100
W. Wilbraham (V) (Wilbraham T)		No Municipal System		200

Table 12—Known Sources of Domestic Sewage Pollution,
Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Williamsburg (T)		No Municipal System		100
Winchendon (T)	3,000	Sand Filters	Satisfactory	150
Winchendon (T)		No Municipal System		1,120
Vermont				
Barnet (T)		No Municipal System		55
Beecher Falls (V) (Canaan T)		No Municipal System		50
Bellows Falls (V)	4,000	None		4,000
Bethel (T)	700	None		700
Bloomfield (T)		No Municipal System		350
Bradford (T)	690	None		690
Brattleboro (T) 6/	8,200	None		8,200
Canaan (T)		No Municipal System		85
Danville (T)	225	None		225
E. Ryegate (V) (Ryegate T)		No Municipal System		75
Fairlee (T)				
Lake Morey Inn	200	Septic Tank	Unsatisfactory	180
Gilman (V) (Lunenberg T)		No Municipal System		200
Hartford (T)	600	None		600

6/ Part of town to main stem Conn. R., part to Whetstone Brk. listed as two sources of pollution.

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Ludlow (T)	1,500	None		1,500
Lunenburg (T)	100	None		100
Lyndon (T)	100	None		100
Lyndon Center (V) (Lyndon T)	200	None		200
Lyndonville (V) (Lyndon T)	1,500	None		1,500
Newbury (T)	420	None		420
Norwich (T)	65	None		65
Passumpsic (V) (Barnet T)	35	None		35
Quechee (V) (Hartford T)	200	None		200
Randolph (T)	1,850	None		1,850
Readsboro (T)	400	None		400
Rochester (T)	300	None		300
St. Johnsbury (V)	7,250	None		7,250
S. Royalton (V) (Royalton T)	300	None		300
S. Ryegate (V) (Ryegate T)	30	None		30
Springfield (V)	5,200	None		5,200
White River Jct. (V) (Hartford T)	2,000	None		2,000
Wilder (V) (Hartford T)	600	None		600

Table 12—Known Sources of Domestic Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Wilmington (T)	200	None		200
Woodstock (V)	1,200	None		1,200
Windsor (T)	3,000	None		3,000
New Hampshire				
Bethlehem (T)	5,000	None		5,000
Canaan (T)		No Municipal System		N
Carroll (T)		No Municipal System		180
Mt. Washington Hotel	1,000	None 5/		1,000
Bretton Arms	300	Primary	Unsatisfactory	270
Mt. Washington Caddy Camp	70	Primary	Unsatisfactory	65
Crawford House	420	None		420
Fabyan Hotel	375	None		375
Twin Mt. Hotel	180	None		180
Rosebrook Inn	65	None		65
Wayside Inn	45	None		45
Y-D Cabins	45	None		45
Carroll Inn	48	Primary	Unsatisfactory	48
Charlestown (T)	700	None		700
Claremont (C)	9,600	Primary Chlorination	Satisfactory	5,700
Claremont (T)		No Municipal System		N
Colebrook (T)	1,600	None		1,600

5/ Existing treatment plant not in use; to be reconditioned and chlorination added and in operation in 1952.

Table 12—Known Sources of Domestic Sewage Pollution Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Watercourse 3/
Croydon (T)		No Municipal System		N
Dixville (T)				
—Balsam Hotel	900	Primary	Unsatisfactory	810
Enfield (T)		No Municipal System		300
Goshen (T)		No Municipal System		N
Groveton (V) (Northumberland T)	1,400	None		1,400
Hanover (T)	3,000	None		3,000
Hanover (T)	1,500	Primary	Unsatisfactory	1,100
Hinsdale (T)	1,400	None		1,400
Jefferson (T)		No Municipal System		180
—Waumbec Hotel	225	None		225
Keene (C)	15,000	Primary	Unsatisfactory	9,000
Lancaster (T)	2,100	None		2,100
Lebanon (T)	5,500	None		5,500
Lisbon (T)	1,500	None		1,500
Littleton (T)	3,000	None		3,000
Marlboro (T)		No Municipal System		500
Newport (T)	5,000	None		5,000
Newport (T)				
—(3 Communities)		No Municipal System		N
Northumberland (T)		No Municipal System		100

Table 12--Known Sources of Domestic Dewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Community 1/	Population Sewered 2/	Treatment	Adequacy of Treatment	Est. P.E. Discharged to Water-course 3/
N. Walpole (V) (Walpole T)		No Municipal System		200
Sunapee (T)		No Municipal System		1,000
Troy (T)		No Municipal System		800
Walpole (T)	900	None		900
W. Lebanon (V) (Lebanon T)		No Municipal System		1,000
W. Swanzey (V) (Swanzey T)		No Municipal System		1,000
Winchester (T)		No Municipal System		1,000
Whitefield (T)	1,600	None		1,600
Woodsville (V) (Haverhill T)	3,000	None		3,000
Grand Total	1,008,000 4/			694,660 4/

* Treatment plant satisfactory but chlorination to be required.

1/T - Town; V - Village; C - City; F.D. - Fire District; W.D. - Water District.

2/N - Information not available.

3/P.E. - Pollution in equivalent number of persons; does not include effects of industrial wastes intercepted by municipal sewers.

4/Does not include six small villages for which information is incomplete.

Summary of Sewage Pollution Contributed by Institutions

Institutional sewage is a relatively minor source of pollution in the Connecticut River Basin. There are 19 significant institutions and 15 have been provided with sewage treatment facilities. Many of the institutions are located on small streams and complete sewage treatment plants have been provided. All but three of the institutional sewage treatment facilities are satisfactory in design and operation.

Pollution takes the form of effluents from 11 secondary sewage treatment plants, 4 primary treatment plants and untreated sewage from 4 institutions. The sewage from 12,260 persons is satisfactorily treated, the sewage from 1,795 persons is discharged after inadequate treatment, and the sewage from 1,070 persons is discharged without treatment. The estimated population equivalent of all institutional sewage discharged to watercourses is 6,200 persons.

Table 13, which follows, lists the sources, and certain of the related data, of significant institutional sewage pollution in the Connecticut River Basin.

Table 13—Sources of Institutional* Sewage Pollution, Connecticut River Basin, 1951

Institution	Population Served 1/	Treatment	Treatment Status 2/	Est. P.E. Discharged to Watercourse 3/
CONNECTICUT				
Bloomfield town				
St. Thomas Seminary	400	Secondary	S	40
Enfield town				
Osborn Prison Farm	175	Secondary	S	20
Middletown town				
State Hospital	4,000	Primary	S	2,400
Newington town				
Home for Crippled Children	210	Secondary	S	20
State Sanitarium	570	Secondary	S	60
U.S. Veteran's Hospital	475	Secondary	S	50
Rocky Hill town				
Veteran's Home	800	Primary	S	480
Windsor Locks town				
Bradley Airfield	880	Secondary	S	95

Table 13—Sources of Institutional* Sewage Pollution, Connecticut River Basin, 1951 (Cont'd.)

Institution	Population Served 1/	Treatment	Treatment Status 2/	Est. P.E. Discharged to Watercourse 3/
MASSACHUSETTS				
Belchertown town				
State School	1,600	Secondary	U	480
Monson town				
State Hospital	1,850	Secondary	S	170
Monson Academy	N	None		N
Northampton city				
Hampshire County Sanitarium	200	Secondary	S	10
Northfield town				
Mt. Hermon School	500	None		500
Northfield Schools, Inc.	500	None		500
Templeton town				
Hospital Cottages	195	Primary	U	120
Fernald State School	310	Secondary	S	20
Westfield City				
State Sanitarium	390	Secondary	S	20
Chicopee city				
Westover Field	2,000	Primary	S	1,200
NEW HAMPSHIRE				
Carroll town				
Twin Mt. School	70	None		24
TOTALS	15,125 4/			6,220

* Includes significant public and private institutions and schools, and military reservations.

1/ N - Data undetermined.
2/ S - Satisfactory; U - Unsatisfactory
3/ P.E. - Pollution in equivalent number of persons.

Summary of Pollution Contributed by Industry

The role of industry in the pollution of watercourses in the Connecticut River Basin cannot be accurately defined from the data that are available. Its contribution to pollution is known to be a large one, however, and probably exceeds the population equivalent of approximately 700,000 persons discharged by all sources of domestic sewage pollution.

The locations and types of industrial wastes discharged are known in almost every instance but for the most part data on volumes, strengths and effects of industrial wastes on streams have not been determined. Comprehensive surveys of some of the principal tributaries of the Connecticut River and accurate measurements at individual industrial establishments have been made but these sources of pollution represent less than 15 percent of the total number known to discharge to watercourses.

There are 262 industrial plants known to discharge process wastes directly into watercourses without treatment. There are an additional 12 known and five suspected sources of industrial waste pollution, the kind and/or disposition of wastes not having been determined. Most of these undetermined sources of pollution are represented in small manufacturing plants.

A preponderance of the process wastes are organic in composition and the largest amounts are discharged by the textile, paper and dairy industries. A large number of miscellaneous industries (tanneries, chemical, food processing, etc.) also produce substantial amounts of organic waste pollution. Inorganic wastes present a special problem and are discharged in considerable volume, particularly by the fabricated metal, machine and tool industries. Other significant inorganic wastes are produced by the chemical, sand and gravel, wood products and miscellaneous industries. Sawdust and oil, although organic in composition, are largely nonputrescrible and the effects of these materials are more closely akin to inorganic pollution. The practice of disposing of sawdust in streams is widespread in Vermont and oil pollution by the metal industries, garages and bulk plants is significant in the lower parts of the basin.

In addition to pollution contributed by process wastes, industry makes a widespread use of streams for the disposal of employee sanitary sewage. This practice results in an appreciable increase in the amount of pollution attributable to industry. During periods of normal employment, 249 industrial plants daily discharge to watercourses the untreated sanitary sewage from a total of more than 42,500 employees. There are an additional 50 manufacturing plants for which the information on disposal of employee sewage has not been determined but most of which are believed to discharge sanitary wastes to streams without treatment. Industry has provided 35 treatment facilities for employee sewage but 21 of these are inadequate and unsatisfactory effluents are discharged to streams. The population equivalent of known sources of employee sanitary sewage is estimated to be 14,000 persons. When all sources of employee sewage have been determined the population equivalent will probably total more than 15,000 persons during periods of average industrial activity.

All of the known sources of untreated industrial wastes, together with data on employee sewage, is presented below in Table 14. The location of sources, the receiving watercourses, types of wastes discharged and the estimated number of employees contributing sanitary sewage are given.

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951

Receiving Watercourse and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
CONNECTICUT			
Connecticut River			
Windsor Locks (T)	The Montgomery Co.	Silver Plating	200
" "	C.H. Dexter & Sons Inc.	Paper (Bond)	250
" "	Windsor Locks Paper Co.	Paper	50
" "	George P. Clark Co.	None	65
" "	E. Horton & Sons Co. Inc.	None	45
" "	Gabb Mfg. Co.	None	15
Rocky Hill (T)	Connecticut Foundry Co.	Foundry Dust	150
" "	Hartford Rayon Corp.	Textile (Rayon)	Treated
Cromwell (T)	The J.&E. Stevens Co.	Metal Plating	225

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-course and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Connecticut River			
Essex (T)	The Essex Boat Works, Inc.	None	16
"	Essex Marine Railway, Inc.	None	10
"	Essex Boat Dock	None	Treated
Old Saybrook (T)	Saybrook Laundry, Inc.	Laundry	Treated
Scantic River			
Somersville (V)	Somersville Mfg. Co.	Textile (woolens)	Treated 2/
Scitico (V)	Gordon Bros., Inc.	None	16
Broad Brook			
Broad Brook (V)	Broad Brook Co.	Textile (woolens)	450
Farmington River			
Collinsville (V)	The Hurley Mfg. Co.	None	36
"	The Collins Co.	Metal Processing	500
Unionville (V)	Pioneer Steel Ball Bearing Company	None	50
"	Lapointe Plascomold Corp.	None	Treated 2/
"	Sailing Mfg. Co.	None	Treated 2/
"	New England Spring Mfg. Company, Inc.	None	Treated 2/
"	Hartford Spinning Co. Inc.	Textile (wool, rayon, yarn)	240
"	Mrytle Knitting Mills	Textile (washing)	250
"	Charles W. House & Sons Inc.	Felt (dye and finish)	Treated 2/

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Farmington River			
Simsbury (T)	Ensign-Bickford Co.	Fuse Mfg. (Caustics)	Treated
Rainbow (V)	Stevens Paper Mills, Inc.	Fiber Board	150
Still River			
Winsted (C)	Gilbert Clock Corp.	Metal Plating & Degreasing	400
"	Fairchilds Screw Prod.	None	18
"	Winsted Mfg. Company	None	25
"	Winsted Hosiery Co.	Textile (Mixed)	260
Mad River			
Winsted (C)	Capitol Products Co. Inc.	Chrome Plating	60
"	Ed. F. Hickey's Sons, Inc.	Felt Fur	135
"	Hudson Wire Co.	None	150
"	The Dano Electric Co.	None	140
"	Maderite Paper Box Co.	None	14
"	H. Baker of Connecticut	None	25
"	The Winsted Co.	Metal Plating	11
"	Keratene Co. (2 plants)	Amino Acid Mfg.	22
"	Mason Silk Co.	Textile (Dye & finish)	60
"	New England Knitting Co.	Wool & Cotton (Dye & Finish)	200
"	Sterling Name Tape Co.	None	10

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Manufacturers Stream			
Winsted (C)	The Union Pin Co.	Metal Plating	40
"	Winsted Hardware Mfg. Co.	Metal Plating	160
"	Jewell Products, Inc.	None	23
"	Son Chief Electrics Co. Inc.	Metal Plating	190
"	Winsted Edge Tool Co.	None	46
Pequabuck River			
Plainville (T)	H. C. Baum & Company	Metal Plating	Treated 2/
"	M.H. Sullivan Foundry	None	15
"	Plainville Electro-Plating Co.	Metal Plating	30
"	Bristol Screw Co.	None	Treated
"	Bristol Spring Co.	None	10
Park River			
W. Hartford (T)	Whitlock Mfg. Co.	Metal Pickling	None
"	Holo-Krome Screw Corp.	Oils	None
Hartford (C)	Underwood Elliott Fisher Co.	Metal Plating	None
Piper Brook			
New Britain (C)	Landers, Frary & Clark (main plant)	Metal Plating	None
"	P. & F. Corbin	Metal Plating	None
"	Corbin Screw Division	Metal Plating	None
"	The Fafnir Bearing Co.	Metal Plating	None

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location [1]	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage [3] Estimated Number of Employees
Piper Brook			
New Britain (C)	New Britain Machine Co.	Metal Plating	None
"	North & Judd Mfg. Co.	Metal Plating & Oil Hardening	None
"	Russell & Erwin Mfg. Co.	Metal Plating	None
"	Stanley Rule & Level Co.	Metal Plating	None
Hockanum River			
Talcottville (V)	Aldon Spinning Mills	None	100
Manchester (T)	Old Colony Co.	None	Treated [2]
E. Hartford (T)	Case Brothers Inc.	Paperboard	100
"	Sanitary Paper Mills, Inc.	Paper Mill	Treated [2]
"	The Burnside Co.	Asbestos and wood board	25
Hop Brook			
Manchester (T)	Case Brothers, Inc.	Paper and Board Mill	Treated [2]
Lydall Brook			
Manchester (T)	Lydall & Foulds Paper Co.	Box Board	40
"	Colonial Board Co.	Paper and Board Mill	125
"	Rogers Bros.	Plastics Mfg.	N
Willow Brook			
E. Hartford (T)	Silver Lane Pickle Co.	Pickle & Relish	Treated [2]
"	United Aircraft Corp.	Metal Plating & Degreasing	N

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Salmon Brook			
Glastonbury (T)	Crescent Tool and Design	None	20
"	New England Play Pen Co.	None	7
"	Airflo Instrument Co.	None	5
"	Firetox System, Inc.	Fire Extinguisher Clean.	10
"	Nutmeg Tool Co.	None	4
Roaring Brook			
S. Glastonbury (V)	Matson Mills Inc.	Textile (woolens)	200
E. Glastonbury (V)	Peerless Woodworking Corp.	None	Treated
Mattabesset River			
New Britain (C)	Landers, Frary and Clark (B & K Plant)	Metal Plating & Processing	None
"	Landers, Frary and Clark (Range Div.)	Metal Processing	None
"	Corbin Cabinet Lock Co.	Metal Plating & Processing	None
"	New Britain Machine Co.	Metal Processing	None
"	Tuttle & Bailey, Inc.	Metal Plating & Processing	None
Kensington (V)	Ferndale Dairy	Dairy	Treated 2/
Berlin (T)	Johnson's Dairy	Dairy	Treated 2/
"	Ventres Dairy	Dairy	Treated 2/
East Berlin (V)	Stanley Chemical Co.	Metal Finishing	120

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Coginchaug River			
Middletown (T)	Rock Fall Textile Printing Corp.	Textile Printing	75
Summer Brook			
Middletown (T)	The Russel Mfg. Co.	Textile (belting etc.)	None
Candlewood Hill Brook			
Higganum (V)	Orkil, Inc.	None	Treated 2/
"	Frismar, Inc.	Paper Stencil Mfg.	65
"	Frissell Fabric Co.	Textile (cotton, rayon)	5
Pocotopaug Creek			
E. Hampton (T)	Artistic Wire Prod. Co. Inc	Metal Cleaning	100
"	Starr Bros. Bell Co.	None	35
"	Johnson Electroplating Works	Metal Plating	10
"	N.N. Hill Brass Co.	Metal Plating & Finishing	Treated
"	Bevin Wilcox Line Co.	None	28
"	Bevin Bros. Mfg. Co.	Metal Plating	100
"	Gong Bell Mfg. Co.	Metal Plating	130
Moodus River			
Moodus (V)	Lloyd E. Cone Thread Co.	None	20

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Watercourses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Moodus River			
Moodus (V)	Brownell & Co. Inc. (Upper Mill)	None	20
"	Brownell & Co. Inc. (Lower Mill)	Textile (dyeing)	9
"	Moodus Net & Twine, Inc.	None	10
"	Machine Design Shop	None	4
"	W.E. Nichols Garage	Garage (oils)	10
"	Neptune Twine & Cord Mills	None	25
Succor Brook			
E. Haddam (T)	Walter A. McCabe Co.	None	16
Pattaconck Creek			
Chester (T)	Bishop & Watrous	None	30
"	Chester Sanitary Laundry	Laundry	15
Great Brook			
Chester (T)	E. W. Deuse Co.	None	Treated 2/
"	M. S. Brooks & Sons	Metal Plating	45
"	C. J. Bates & Sons	Metal Plating	115
Deep River			
Deep River (T)	Electric Soldering Iron Co.	None	30
"	Brass Goods Mfg. Co.	Metal Plating	Treated
"	Uarco	None	Treated

Table 14.—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Deep River			
Deep River (T)	Moore Mfg. Company	None	10
" "	Levett Metal Products Co.	Metal Plating	Treated
" "	White Way Laundry	Laundry	20
Falls River			
Westbrook (T)	Deep River Mfg. Co.	Nickle Plating	Treated
Essex (T)	Pratt, Read & Co., Inc.	None	Treated 2/
"	W. Whitney Stueck, Inc.	None	15
"	Behrens & Bushnell Co. Inc.	Garage (oils)	8
"	Connecticut Valley Mfg. Co.	None	Treated 2/
"	R. W. Cramer Co. Inc.	Metal Plating	Treated
Mud River			
Essex (T)	The Verplex Company	Nickle Plating	Treated 2/
MASSACHUSETTS			
Connecticut River			
Turners Falls (V)	Onion Skin & Manifold Papers	Paper	195
" "	Fine Writing Paper	Paper	325
Northampton (T)	Sulphite Pulp	Paper	350
South Hadley (T)	Condensor Papers	Paper	200
" "	Ledger Bond & Currency Paper	Paper	108
" "	Coated Paper	Paper	N

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Connecticut River			
Holyoke (C)	Fine Writing Paper	Paper	1,000
"	Tissue, Crepe & Wax Paper	Paper	400
"	Writing Paper & Folding Box Board	Paper	325
"	Index & Specialty Paper	Paper	60
"	Coated Paper & Covers	Paper	N
"	Bond, Ledger & Onion Skin Paper	Paper	210
"	Stationery & Greeting Card Paper	Paper	400
"	Quality Paper	Paper	N
"	Bond, Ledger & Stationery Paper	Paper	600
Chicopee (C)	Rendering Company	Rendering	100
"	Brewery	Brewery	35
"	Slaughterhouse & Pork Prod.	Slaughter House	550
Millers River			
Winchendon (T)	Cotton Washing & Dyeing	Textile	350
"	Woodworking Machinery	Foundry	375
"	Wood Toys & Chairs	None	160
"	Bobbins & Spools	None	50

Table 12—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Millors River			
Athol (T)	Hacksaws & Precision Tool	Undetermined	1,200
"	Twist Drills, Reamers & Carbide Tools	Plating	1,600
"	Coated Textiles	Textile (dye & finish)	150
"	Wooden Toys & Paper Boxes	Caustic Cleaning	175
Orange (T)	Machine Needles & Cycle Parts	Acid	193
"	Grey Iron Castings	Foundry	50
"	Valve Reseating Mach.	Acid	175
Erving (T)	Paper Napkins, Towels & Tissue	Paper	300
"	Wooden Shoe Heels	None	150
Millers Falls (V)	Bond, Ledger & Onion Skin Paper	Paper	182
" "	Tools	Metal Plating	1,500
Otter River			
Gardner (C)	Stove Mfg.	Acid Wash & Oil	2,700
"	Chrome Plating	Acid Wash	N
"	Crib & Cradle Mfg.	Paint & Varnish Wash	300
"	Chrome Plating	Acid Wash	1,800
"	Furniture	Acid Wash	60

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Otter River			
Gardner (C)	Paint and Varnish	Paint & Varnish Wash	150
"	Oil Storage	Oil Spillage	N
Baldwinsville (V)	Napkins, Towels and Toilet Paper	Paper	21
"	Paper	Paper	24
Deerfield River			
Monroe Village (V)	Glassine & Greaseproof Papers	Paper	200
Shelborne Falls (V)	Cutlery	Undetermined	120
North River			
Colrain (T)	Absorbent Cotton & Gauze	Textile (cotton)	N
Manhan River			
East Hampton (T)	Cotton & Synthetic Yarns	Textile (cotton)	375
" "	Cotton Fabrics & Yarn	Textile (dye and finish)	N
" "	Rubber Thread	Textile	100
" "	Felt Piece Goods	Textile (dye and bleach)	60
" "	Webbing (Non-elastic & Elastic)	Textile	625

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Bachelor Brook			
S. Hadley (T)	Crepe, Tissue & Wax Paper	Paper	200
Stony Brook			
S. Hadley (T)	Paper	Paper	200
Chicopee River			
N. Wilbraham (V)	General Plastic Housewares	Undetermined	100
" "	Cold Drawn Pinion, Wire & Rod	Undetermined	21
Springfield (C)	Several Small Industries in One Company	Undetermined	500
"	Plastics, Industrial Resins	Plastics	N
"	Vinylacetal Resins	Resins	None
Chicopee (C)	Sporting Arms & Lawn Mowers	Undetermined	1,700
"	Tires	Undetermined	N
Quaboag River			
Brookfield (T)	Paper Coaters	Paper	Treated 2/
W. Brookfield (T)	Wire Mfg.	Acid	Treated
" "	Yeast Mfg.	Yeast	Treated
Warren (T)	Pumps	None	200
West Warren (V)	Cotton & Woolen Fabrics	Textile (dye & finish)	75
" "	Cotton Cloth	Textile (dye & finish)	375
" "	Cotton Cloth	" "	375

Table 14.—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Quaboag River			
W. Warren (V)	Textile Processing	Textile (dye and finish)	325
Palmer (T)	Steel Wire	Acid Pickling	900
"	Wire Brushes & Mops	None	390
Seven Mile River			
E. Brookfield (T)	Cotton Fabrics	Textile (dye and bleach)	Treated 2/
Chicopee Brook			
Monson (T)	Woolen Fabrics	Textile	425
"	Commercial Laundry	Laundry	20
"	Mfgs. Toilet Seats	Undetermined	65
Ware River			
Wheelwright (V)	Facial Tissues & Napkins	Paper	N
Ware (T)	Undetermined Industry	Undetermined	N
Prince River			
Barre (T)	Drilling & Tapping Machines	Undetermined	200
Westfield River			
Chester (T)	Grinding Wheels	None	100
Huntington (T)	Woolen Men's Wear	Textile (dye and finish)	150
Russell (T)	Latex Board & Paper	Paper	90
Woronoco (V)	High Grade & Specialty Paper	Paper	300

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Westfield River			
W. Springfield (T)	High Grade & Specialty Paper	Paper	300
" "	Bond, Ledger & Typewriting Papers	Paper	75
Westfield Little River			
Westfield (C)	Condenser Paper	Paper	230
"	Thread Mfg.	Textile (dye)	120
"	Textile Winding Machines	Undetermined	500
"	Bicycles	Acid	200
NEW HAMPSHIRE			
Connecticut River			
Northumberland (T)	Wyoming Valley Paper Mill	Paper	300
N. Walpole (V)	Vermont Packing Co.	Slaughter House	25
Upper Ammonoosuc River			
Groveton (V)	Groveton Paper Co.	Paper	221
Johns River			
Whitefield (T)	Mellin-Quincy Mfg. Co. Inc.	None	Treated 2/
Ammonoosuc River			
Carroll (T)	Crawford Garage	Oils	15
Littleton (T)	Saranac Glove Company	Tannery	122
"	Norton Pike Company	Abrasives	150

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Mascoma River			
Enfield (T)	American Woolen Co.	Textile (wool finish)	215
"	American Excelsior Corp.	None	25
Lebanon (T)	American Woolen Co.	Textile (wash and dye)	245
"	E. Cummings Leather Co.	Tannery	77
"	Densmore Brick Company	Lime Wash	21
"	Lebanon Woolen Mills Corp.	Textile (wash and dye)	261
"	Mascoma Woolen Mills Co.	Textile (wash and dye)	N
Sugar River			
Newport (T)	Dorr Woolen Co.	Textile (wash and dye)	153
"	Brampton Woolen Co.	Textile (wash and dye)	145
"	A. Caplan Dusting Mill	Wool Dusting	20
"	International Shoe Co.	None	300
Claremont (T)	Claremont Waste Mfg. Co.	Textile (dye)	70
"	Claremont Paper Co.	Paper	135
"	Joy Manufacturing Co.	None	975
"	Dartmouth Woolen Mills	Textile (wash and dye)	326
"	Coy Paper Company	Paper	61

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Ashuelot River			
Keene (C)	Faulkner & Colony Mfg. Co.	Textile (wash and dye)	216
"	Public Service Company	Phenolic	37
"	R. C. Swan Company	Textile (wash)	31
W. Swanzey (V)	Homestead Woolen Co.	Textile (wash and dye)	314
Winchester (T)	A.C. Lawrence Leather Co.	Chrome Tannery	183
"	New England Box Co.	Undetermined	N
Hinsdale (T)	Ashuelot Paper Co.	Paper	53
"	Hinsdale Paper Co.	Paper	53
"	Paper Service Co.	Paper	10
"	The Robertson Company	Paper	12
"	White Washborne Company	Paper	112
The Branch			
Marlboro (T)	Essex Yarn Company	Textile (wash)	36
"	J.M. Geilenberg Co.	Textile (wash)	15
"	Medford-Marlboro Knit Garter Inc.	Felts (wash and dye)	50
"	Minnewawa Mfg. Company	Textile (cotton)	27
"	Monadnock Blanket Mills	Textile (wash)	49

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
So. Br. Ashuelot River			
Troy (T)	Troy Blanket Mills	Textile (wash and dye)	529
VERMONT			
Connecticut River			
Gilman (V)	Kraft Paper & Sulphite Pulp	Paper	475
Barnet (T)	Milk Receiving Station	Milk	3
McIndoe Falls (V)	Undetermined	Undetermined	N
E. Ryegate (V)	Groundwood Printing Papers	Paper	120
Wells River (V)	Dairy	Undetermined	N
Newbury (T)	Milk & Cheese Mfg.	Milk & Cheese	7
Piermont Station (V)	Milk & Butter Mfg.	Milk & Butter	40
Windsor (T)	Rubber Heels	Zinc Stearate	None
Bellows Falls (V)	Poultry Slaughterhouse	Slaughter-house	N
" "	Processes Milk & Cream	Undetermined	70
" "	Gummed Kraft Paper	Paper	150
Brattleboro (T)	Dairy Products	Milk	2
"	Mfg. Cleaning Fluid and Shoe White	Chemical	45
Passumpsic River			
East Burke (V)	Lumber Company	Undetermined	N

Table 14.—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses & Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Passumpsic River			
Lyndonville (V)	Gravel Washing	Wash Water	N
"	Milk and Ice Cream	Milk	100
"	Carbon Dies & Screw Plates	Cutting Oils and Solvents	120
St. Johnsbury Center (V)	Dairy Products	Dairy	N
Moose River			
Concord (T)	Whole Milk & Dry Skim Milk	Milk	10
Sleepers River			
St. Johnsbury (V)	Creamery	Dairy	N
Andric Brook			
Danville (T)	Milk and Cream	Dairy	N
Stevens River			
W. Barnet (V)	Milk and Cream	Dairy	N
Peacham (T)	Shingle Sawmill	Sawmill	2
Wells River			
Groton (T)	Milk and Cream	Dairy	N
S. Ryegate (V)	Bakers & Cottage Cheese	Cheese	N
Wells River (V)	Tissue Paper	Paper	60
Waits River			
Waits River (V)	Sawmill	Sawmill	15

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Waits River			
Bradford (T)	Milk Receiving Station	Milk	N
Ompompanoosuc River			
Vershire (T)	Sawmill	Sawmill	N
W. Fairlee (V)	General Dairy	Dairy	N
Post Mills (V)	Wood Products	Sawdust	40
White River			
Granville (T)	Wood Products	Sawdust	N
S. Royalton (V)	Undetermined	Undetermined	125
Hartford (T)	Wool Cloth	Textile	200
Tweed River			
Stockbridge (T)	Sawmill	Sawmill	N
Third Br. White River			
Bethel (T)	Sawmill	Sawmill	N
Ayer's Brook			
E. Braintree (V)	Sawmill	Sawmill	N
Second Br. White River			
E. Randolph (V)	Milk Receiving Station	Milk	N
First Br. White River			
Chelsea (T)	Condensed Milk Mfg.	Milk	N
Tunbridge (T)	Milk Receiving Station	Milk	N

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
First Br. White River			
S. Royalton (V)	Sawmill	Sawmill	N
Ottauquechee River			
Plymouth (T)	Sawmill	Sawmill	N
Bridgewater (T)	Woolen Cloth	Textile (wash and dye)	150
Woodstock (T)	Dairy Products	Dairy	N
Lulls Brook			
Hartland (T)	Sawmill	Sawmill	N
Bashan Brook			
Windsor (T)	Dairy Products	Dairy	N
Mill Brook			
Brownsville (V)	Finished Lumber	Sawmill	N
Windsor (T)	Milk Receiving Station	Milk	N
Black River			
Ludlow (T)	Sawmill	Sawmill	N
"	Woolen Cloth	Textile (dye)	N
Smithville (V)	Snow Cloth Linings	Textile (dye)	N
Proctorsville (V)	Sawmill	Sawmill	N
Cavendish (T)	Woolen Piece Goods	Textile (dye)	N
"	Sawmill	Sawmill	N
N. Springfield (V)	Dairy Products	Dairy	N

Table 14—Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
Black River			
Springfield (T)	Gear Finishing	Grinding Compounds	None
"	Machine Tools	Grinding Compounds	None
"	Textile (Used Wool)	Textile (dye)	90
"	Metal Working	Grease	N
Branch Brook			
Healdville (V)	Cheese Mfg.	Cheese	2
So. Br. Williams River			
Chester (T)	Sawmill	Sawmill	N
Saxtons River			
Saxtons River (V)	Sawmill	Sawmill	10
" "	Wood Turning	Sawmill	10
" "	Dairy Products	Dairy	N
Gageville (V)	Mfg. Baskets	Shavings	38
Bellows Falls (V)	Paper	Paper	38
So. Br. Saxtons River			
Townshend (T)	Sawmill	Sawmill	N
Sackett's Brook			
Putney (T)	Tissue Paper	Paper	20
West River			
Londonderry (T)	Sawmill	Sawmill	10
W. Townshend (V)	Sawmill	Sawmill	N

Table 14--Known and Suspected Sources of Untreated Industrial Wastes and Sewage Pollution from Manufacturing Plants, Connecticut River Basin, 1951 (Continued)

Receiving Water-courses and Plant Location 1/	Name of Manufacturing Plant or Type of Product	Types of Industrial Wastes Discharged	Sewage 3/ Estimated Number of Employees
West River			
Brattleboro (T)	Milk Receiving Station	Milk	N
Whetstone Brook			
W. Wardsboro (V)	Sawmill	Sawmill	N
Wardsboro (T)	Sawmill	Sawmill	2
"	Sawmill	Sawmill	2
Wardsboro Brook			
Newfane (T)	Sawmill	Sawmill	N
Rock River			
East Dover (V)	Sawmill	Sawmill	N
Marlboro Br. Rock River			
Marlboro (T)	Sawmill	Sawmill	N
Whetstone Brook			
Brattleboro (T)	Sawmill	Sawmill	63
E. Br. North River			
Jacksonville (V)	Sawmill	Sawmill	N
"	Dairy Products	Dairy	N
Halifax (T)	Sawmill	Sawmill	N
"	Sawmill	Sawmill	N

1/ T - Town; V - Village; C - City
2/ Sanitary Sewage Inadequately Treated
3/ N - Information Unavailable or Undetermined

In addition to the sources of industrial waste pollution discussed above and tabulated in Table 14, the streams in the basin receive the effluents from 18 industrial waste treatment plants. Eight of these plants are considered by the State water pollution control agencies to be adequate for the foreseeable future, four are reported to be inadequate by reason of design, loadings or operation, and the status of six is undetermined. Nine of the manufacturing plants also discharge unsatisfactorily treated employee sewage. Eight of the treatment facilities treat wastes that are largely inorganic in nature and the remainder treat wastes that are predominantly organic in composition. The population equivalents of effluents discharged to streams are not known but from the nature of the wastes treated it is estimated that the total reaches well into the thousands.

Table 15 lists the existing sources of industrial waste treatment plant effluent pollution and shows plant locations, receiving watercourses, types of wastes treated and status of treatment provided.

Table 15--Existing Sources of Industrial Waste Treatment Plant Effluent Pollution, Connecticut River Basin, 1951

Receiving Watercourse	Name or Product and Location 1/	Type of Wastes Treated	Treatment Status 2/
Park River	Jacobs Mfg. Co. W. Hartford, Conn.	Cutting compounds, oils	S
Hubbard Brk.	H. L. Roser & Sons Glastonbury, Conn.	Pigskin tannery	S
Hubbard Brk.	J. B. Williams Co. Glastonbury, Conn.	Men's toilet goods	S
Pequabuck R.	Yeaman's Plating Corp. Plainville, Conn.	Metal plating	S
Mattabesset R.	New Britain Gas and Light Company New Britain, Conn.	Tars and oils	S
Salmon R.	C. H. Norton Co., N. Westchester, Conn.	Fiber board	S
Mud River	E. E. Dickinson Co. Essex, Conn.	Witch hazel	S

Table 15--Existing Sources of Industrial Waste Treatment Plant Effluent Pollution, Connecticut River Basin, 1951 (Continued)

Receiving Watercourse	Name or Product and Location 1/	Type of Wastes Treated	Treatment Status 2/
Pattaconck Crk.	Russell Jennings Mfg. Co., Chester, Conn.	Dust Collection	U
Pewterpot Brk.	Lombardo Bros. E. Hartford, Conn.	Slaughterhouse	S 3/
Falls River	Ernst Bischoll Co. Inc. Essex, Connecticut	Plastics, pharmaceuticals	N 3/
Unnamed Brk.	John Magee Co. Old Saybrook, Conn.	Cherry, olive bottling	U 3/
Westfield R.	Cleansing tissues Becket, Mass.	Paper mill	U
Westfield R.	Glassine paper Russell, Mass.	Paper mill	U 3/
Ware River	Scored and combed wool S. Barre, Mass.	Wool scouring	N 3/ 4/
Connecticut R.	Manila & speciality papers, Bellows Falls, Vermont	Wood pulping	N 3/
Connecticur R.	Optical lenses Brattleboro, Vermont	Grinding	N 3/
Moose R.	Casein Concord, Vermont	Milk	N 3/
West Branch Ompompanoosuc R.	Copper concentrates S. Strafford, Vermont	Mine tailings	N 3/

1/ Policies established in Vermont and Massachusetts prohibit publishing names of manufacturing plants.

2/ S - Satisfactory; U - Unsatisfactory; N - Undetermined

3/ Employee sewage untreated, inadequately treated, or disposition unknown.

4/ Improvements recently completed but adequacy undetermined.

Pollution Resulting from Soil Erosion

The banks of the Connecticut River and its nothern tributaries are subject to erosion, particularly during high spring run-off periods. In some areas erosion results in serious loss of good land by cutting down banks at the rate of five to ten feet per year. Sheet and gully erosion are problems along the cultivated lands in the lower part of the basin. Soil erosion contributes to the pollution of the Connecticut River Basin but the conveyance of silt is not considered a serious impairment to water quality for normal downstream uses most of the time. Erosion control measures to conserve the land resources would, however, result in improved water qualities, especially during periods of high run-off.

Pollution Contributed by Trash Disposal

There is a generally widespread, though not large scale, use of the watercourses for the disposal of trash and sometimes garbage. The practice is principally confined to householders, business establishments, and others located on properties abutting, or convenient to streams. In terms of population equivalent this type of pollution contributes but little to the impairment of downstream water quality. The use of streams as "hydraulic incinerators" does, however, materially reduce the visual aesthetic quality of the watercourses.

Resume of All Pollution Contributed to Water Resources

The preceding discussions have demonstrated that there is a widespread use of the water resources of the Connecticut River Basin for the transportation of wastes and this has resulted in significant organic and inorganic pollution of many of the principal waters. The tables and maps presented in this section on pollution contributed to water resources contain most of the available information on the sources of pollution. In order to being these data into simple focus, and to carry these forward into succeeding discussions, a synopsis of the pollution contributed to water resources is presented by Table 16. This table shows the general types of pollution and the number of sources or population contributing to pollution.

Table 16—Synopsis of General Classification and Number of Sources* of Pollution Contributed to Water Resources - Connecticut River Basin, 1951

General Classification	No. of Sources or Estimated No. Persons Contributing
Untreated textile wastes................	54 mills
Untreated paper mill wastes.............	56 mills

Table 16—Synopsis of General Classification and Number of Sources* of Pollution Contributed to Water Resources - Connecticut River Basin, 1951 (Continued)

General Classification	No. of Sources or Estimated No. Persons Contributing
Untreated metal processing wastes................	55 plants
Untreated milk processing wastes.................	29 plants
Untreated chemical manufacturing wastes..........	6 plants
Untreated slaughterhouse wastes..................	3 plants
Untreated laundry wastes.........................	4 plants
Untreated tannery wastes.........................	3 plants
Untreated furniture manufacturing wastes.........	4 plants
Untreated miscellaneous manufacturing wastes.....	21 plants
Sawmill and wood specialty manufacturing wastes..	34 plants
Garage and oil storage wastes....................	5 sources
Inadequately treated industrial waste effluents..	4 plants
Undetermined treated industrial waste effluents..	6 plants
Adequately treated industrial waste effluents....	8 plants
Untreated municipal sewage 1/ 2/.................	340,520 persons
Untreated domestic sewage from private sewers....	21,025 persons
Untreated industrial sanitary sewage.............	over 42,500 employees
Inadequately treated municipal sewage 3/.........	151,888 persons
Inadequately treated industrial sanitary sewage..	5,000 employees
Adequately treated municipal sewage plant effluents 4/..................................	509,750 persons
Adequately treated industrial sanitary sewage....	1,200 employees

Table 16—Synopsis of General Classification and Number of Sources* of Pollution Contributed to Water Resources - Connecticut River Basin, 1951 (Continued)

General Classification	No. of Sources or Estimated No. Persons Contributing
Soil erosion................................	Undetermined
Trash and garbage...........................	Undetermined

* Discharging directly to watercourses.

1/ Does not include effects of industrial wastes intercepted.
2/ Includes 8 resort hotels and 4 institutions.
3/ Includes 5 resort hotels and 2 institutions.
4/ Includes 13 institutions.

Part 11

DAMAGES TO WATER RESOURCES FROM POLLUTION

General

There is a widespread use of the surface water resources of the Connecticut River Basin for the transportation of industrial wastes and sewage. This has resulted in significant damages to the quality of many of the principal water resources. Damages have been more serious in the lower one-fourth of the basin where industrial and residential concentrations are greatest but damages are also significant in the northern regions where recreational use of the water resources is important to the economy. There is an extensive use of the water resources for almost all normal purposes and these are often curtailed or eliminated by damages resulting from pollution.

The main stem of the Connecticut River, all of its 23 principal tributaries, 29 of its lesser tributaries and 72 streams tributary to the above watercourses transport pollution. This is a total of 125 streams receiving pollution, the main stems of which have a total watercourse length of 2050 miles. There has been significant damage to approximately 1120 of these miles as a result of pollution. Damages range in extent from exclusion of use for recreational bathing to creation of nuisance conditions during critical periods.

There are many small headwater brooks and an appreciable number of the larger streams along the rim of the basin that transport only natural pollution from which results little or no damage. More than 250 miles of other streams are in protected watersheds set aside for public water supplies and to which there are no damages from pollution. The Connecticut River is undamaged during the first 44 miles of its course and for 40 miles in central Massachusetts the river has recovered from pollution received in Vermont and New Hampshire and the water quality through this stretch is suitable for nearly every legitimate purpose. The Nulhegan River in Vermont is damaged only the last mile before confluence with the Connecticut. There are nine other small streams that receive effluents from sand filter beds or pollution from only one small source that results in no damages to normal uses. The total length of streams undamaged by pollution probably equals the lengths of streams that are damaged but it should be remembered that the former are for the most part small streams with low runoff much of the time. The small undamaged streams are of relatively small industrial significance but are of considerable importance to recreation and the development of future public surface water supplies.

Damages to Water Resources from Pollution

The development of the Connecticut River Basin has resulted in a diverse as well as substantial economy and in which the water resources play a most important role. The present day economy of the basin has resulted in a widespread use of the water resources for most legitimate purposes. Of most importance are the uses for domestic water supply, industrial water supply, power development, livestock watering, irrigation, game fishing, recreational bathing, wildlife habitat and transportation of wastes. Of relatively less importance are the uses for navigation, recreational boating, commercial fishing and shell fish propagation.

The growth of these water uses, brought about by economic expansion, increased populations and social changes, has resulted in various conflicts between such uses, principally brought about by damages resulting from pollution. The most significant conflicts are between those restricting watersheds for public water supply purposes only and those desiring their use for recreation; between interests desiring to reserve undamaged waters for recreational, agricultural and domestic water supply uses as against their industrial development; and the conflict between the use of watercourses for the transportation of wastes as opposed to present uses for most other purposes. As the industrial expansion continues and the population increases, these conflicts will need to be resolved by some comprehensive plan to accommodate all desired water uses equitably.

The use of the water resources for the disposal of large volumes of industrial wastes and sewage results in the greatest conflict with all other water uses. There is discharged to watercourses daily the untreated domestic sewage from 361,500 persons; the inadequately treated sewage from 151,800 persons; the satisfactorily treated sewage effluents from plants serving 509,700 persons; the untreated sanitary wastes from 42,500 employees of industrial establishments; the treated sanitary sewage, mostly unsatisfactory, from 6,200 employees; the untreated industrial wastes from 274 plants; and the effluents from 18 industrial waste treatment plants, several of which are inadequate. The disposal of these large quantities of wastes into the waterways of the basin has resulted in a significant deterioration of the physical, chemical and bacteriological qualities of the waters.

There have been some damages as a result of soil erosion, particularly in the northern regions, but this type of natural pollution has not resulted in serious impairment of the normal uses of the streams. There has also been damage from the disposal of garbage and trash into waterways but this damage is largely aesthetic and the extent to which it is practiced has not been determined.

In the lower one-third of the basin the damages suffered by the water resources result from the discharge of large volumes of domestic and employee sewage and from process wastes discharged by the textile, paper, metal processing and many other industries. In the upper half of the basin the most widespread damage is caused by the discharge of untreated domestic sewage although the more serious damages result from the process wastes of the paper and textile industries. In Vermont, a special problem results from the disposal of sawdust into streams. Sawdust not only creates a visual nuisance but also an environment detrimental to fish and other aquatic life in an area where game fishing is an important attraction of the recreational industry.

Were it not for the physical characteristics of the basin and the construction of numerous dams for power development, the damages to the water resources would be considerably greater than those normally existing. The streams, with rocky bottoms, natural falls and swift currents, have a high reaeration rate and a large capacity for self-purification. Mill ponds and storage reservoirs allow deposition of settleable solids and the waters are rendered more suitable for use downstream. Ponds and reservoirs also decrease rates of run-off that normally would transport pollution much greater distances downstream. Discharge of water over spillways partly replenishes oxygen depleted by biological activity in the ponds and reservoirs.

Damages to the quality of the water resources resulting from pollution have not been measured quantitatively in many streams in the Connecticut River Basin. The States of Massachusetts and Connecticut routinely analyze monthly catch samples taken from the principal streams. The extent of damages to water quality from pollution is related, of course, to the kinds and amounts of pollution to the size and characteristics of the receiving streams and much of this data is available. There is, therefore, sufficient information on hand for the State water pollution control agencies to make a qualitative estimate of the damages to water quality from pollution and this has been done for the watercourses within their respective states.

Of the 125 streams receiving pollution, 116 have been significantly damaged. Twenty-nine miles of the main stems of the latter are protected from pollution for use as public water supplies and the water is of generally excellent quality; approximately 900 miles receive only natural pollution and the water is of good bacteriological and chemical quality, suitable for all uses except public water supply without treatment; about 785 miles of the main stems of these streams receive significant pollution that renders the water unsuitable for public water supply even with treatment, for recreational uses except boating, for some industrial processes without treatment, for irrigation of crops consumed without cooking and it is not always of satisfactory aesthetic quality; some 300 miles are considerably damaged by pollution to an extent that the water is suitable only for transportation of wastes without nuisance, limited industrial purposes and power development; and the remaining 30 miles of main stems of streams transporting pollution are so damaged as to be in nuisance condition during critical periods and the water unsuitable for all uses with the possible exception of power development.

It is to be understood that in the above discussions the damages to water quality from pollution are, in the absence of complete quantitative data, relative and approximated. The miles of watercourse given should be taken to represent the estimated length of streams damaged or undamaged by pollution during average conditions of run-off, water temperature and pollution contributed, in the best judgment of the State water pollution control agencies. There is much of the year when damages from pollution are less than indicated, just as there are periods of critical low flow and high water temperature when damages are greater than shown.

It is not practicable to present a detailed discussion of each of the 116 streams damaged by pollution. These data are more clearly and concisely presented in tabular form. Table 17 is a summation of damage to water quality of each of the 116 streams transporting significant pollution in the Connecticut River Basin. The name of the watercourse, a summary of pollution contributed, the relative damages to water quality and the lengths of main stems of streams affected by pollution during average conditions are given. All watercourses directly tributary to the Connecticut River are so indicated (main stem) and the sub-basins of other streams are indicated.

Figures 5 and 6 show much of this data in more graphic form, the former giving the present stream status of suitability for use and the latter showing present stream conditions.

Table 17 and Figures 5 and 6 follow:

Table 17—Damages* to Quality of Water Resources Resulting from Pollution, Connecticut River Basin, 1951

Key to Symbols Used

A - No damages. Waters protected from pollution and used as public water supplies.

B - No damages. Waters transport only natural pollution or have recovered from sewage and industrial waste pollution. Unsuitable for public water supply without treatment; suitable for all other uses.

C - Damaged. Unsuitable for use as public water supply even with treatment; for recreational uses except boating; for use in some industrial processes without treatment; and for irrigation of crops consumed without cooking. Water not always of satisfactory aesthetic quality.

D - Damaged. Unsuitable for most legitimate water uses. Suitable only for transportation of sewage and industrial wastes without nuisance and for power development and limited industrial purposes. Aesthetic quality poor.

E - Damaged. Unsuitable for all water uses except power development. Nuisance conditions prevail during critical periods.

* Damages given are relative and qualitative and represent the best estimates of State water pollution control agencies.

Table 17 (Continued)--Damages to Quality of Water Resources Resulting from Pollution, Connecticut River Basin, 1951

Watercourse	Damages Resulting from Discharge of --	Damages and Extent in Miles				
		A	B	C	D	E
Connecticut River (Main stem--damages from pollution in New Hampshire and Vermont)	Untreated domestic sewage from 21,650 persons in 17 municipalities; untreated industrial wastes from five pulp and paper mills; 5 milk processing plants; 5 miscellaneous; sanitary sewage from 1,570 employees; and pollution transported by 24 tributaries.	0	44	219	6	0
Connecticut River (Main stem in Massachusetts)	Untreated domestic sewage from 162,000 persons at 13 municipal sources; primary treatment plant effluent from two municipalities with total population equivalent of 84,600 persons; untreated industrial wastes from 14 paper mills and 4 miscellaneous plants; untreated sanitary sewage from 4,800 employees; and pollution transported by 8 tributaries.	0	40	24	10	0
Connecticut River (Main stem in Connecticut)	Untreated domestic sewage from 27,000 persons in 5 municipalities; sewage treatment plant effluents with total population equivalent of 180,000 from 7 municipalities and 1 hospital; untreated industrial wastes from 7 plants; untreated sanitary sewage from 1,500 employees of 12 plants; and pollution transported by 18 tributaries.	0	0	44	20	0

Watercourse	Damages Resulting from Discharge of --	Damages and Extent in Miles				
		A	B	C	D	E
	VERMONT SUB-BASINS					
Nulhegan River (Main stem)	Untreated domestic sewage from private outlets serving 350 persons in the town of Bloomfield, Vermont.	0	14	1	0	0
Neal Brook (Main stem)	Untreated domestic sewage from 100 persons in Lunenburg, Vermont.	0	2	3	0	0
Passumpsic River (Main stem)	Untreated domestic sewage from 9,000 persons in 4 municipalities; untreated industrial wastes from 4 plants; untreated sanitary sewage from more than 220 employees; and pollution transported by 2 tributaries.	0	22	0	0	18
Wheelock Branch (Passumpsic Basin)	Untreated domestic sewage from privately owned sewerage system serving 100 persons in Lyndon, Vermont.	4	4	1	0	0
Moose River (Passumpsic Basin)	Untreated milk processing wastes, casein manufacturing wastes and sanitary sewage from 20 employees in two plants at Concord, Vermont.	0	17	2	7	0
Sleepers River (Passumpsic Basin)	Untreated wastes from one creamery located on river at St. Johnsbury, Vermont.	0	6	0	0	2
Andric Brook (Passumpsic Basin)	Untreated milk wastes at Danville, Vermont, having an estimated population equivalent of 125 persons.	0	6	2	0	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Stevens River (Main stem)	Sawdust from one sawmill in Peacham, Vermont; untreated milk wastes from one plant at West Barnet; and untreated sanitary sewage from 100 employees.	0	6	2	2	0
Wells River (Main stem)	Untreated domestic sewage from 30 persons in Ryegate, Vermont; untreated milk processing wastes from 2 plants; untreated paper mill wastes from 1 mill; and sanitary sewage from 80 employees.	0	13	3	4	0
Waits River (Main stem)	Sawdust and untreated sewage from 15 employees in one mill at Waits River; untreated domestic sewage from 690 persons; untreated milk wastes from 1 plant at Bradford, Vermont.	0	16	1	3	0
Lake Morey (Outlet stream)	Unsatisfactory septic tank effluent from inn serving a maximum of 200 persons.	0	0	2	0	0
Ompompanoosuc River (Main stem)	Sawdust from 2 mills; untreated milk wastes from 1 plant; and untreated sewage from 50 employees.	0	17	3	0	0
West Branch, Ompanpanoosuc River (Ompanpanoosuc Basin)	Chemical waste and tailings from processing copper ore and sanitary sewage from 150 employees at one mill in South Strafford, Vermont.	0	8	0	9	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
White River (Main stem)	Untreated domestic sewage from 1,900 persons residing in 4 communities; untreated woolen textile wastes from 1 mill; untreated sanitary sewage from 325 employees of 2 plants; sawdust from 1 mill; and pollution transported by 3 tributaries.	0	28	14	8	0
Tweed River (White Basin)	Sawdust directly to river from one mill in Stockbridge, Vermont.	0	9	0	1	0
Third Branch (White Basin)	Untreated domestic sewage from 1,850 persons in Randolph, Vermont; sawdust from one mill in Bethel, Vermont, just above confluence with White River.	0	12	9	0	0
Ayer's Brook (White Basin)	Sawdust directly to river from one mill in East Braintree, Vermont.	0	8	1	1	0
Second Branch (White Basin)	Untreated milk processing wastes from 1 plant at East Randolph, Vermont.	0	20	2	0	0
First Branch (White Basin)	Sawdust from 1 mill at South Royalton; untreated milk wastes from 2 plants at Chelsea and Turnbridge, Vermont; and probably untreated employee sewage.	0	14	5	3	0
Ottauquechee River (Main stem)	Untreated domestic sewage from 1,400 persons residing in 2 communities; sawdust from 1 mill in Plymouth; untreated woolen textile wastes and milk wastes from plants in Bridgewater and Woodstock, Vermont; and sanitary sewage from 150 employees.	0	10	8	12	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Lull's Brook (Main stem)	Sawdust from 1 mill at Hartland, Vermont.	0	6	1	0	0
Bashan Brook (Main stem)	Untreated dairy wastes from one plant at Windsor, Vermont.	0	2	0.5	0	0
Mill Brook (Main stem)	Sawdust from 1 mill in Brownsville; untreated milk receiving station wastes from creamery at Windsor, Vermont.	0	14	0	1	0
Black River (Main stem)	Untreated domestic sewage from 6,700 persons residing in Ludlow and Springfield, Vermont; sawdust from 3 mills; untreated industrial wastes from 4 woolen textile mills and 3 miscellaneous plants; untreated sanitary sewage from several hundred employees; and wastes transported by West Branch.	0	16	10	10	4
Branch Brook (Black Basin)	Untreated cheese manufacturing wastes from one plant plus small amount employee sewage.	0	2	0	4	0
Williams River (Main stem)	Pollution transported by 2 tributaries.	0	20	0	0	0
South Branch (Williams Basin)	Sawdust from 1 mill in Chester, Vermont,	0	5	0	2	0
Middle Branch (Williams Basin)	Sources of pollution not reported.	0	8	3	0	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent of Miles				
		A	B	C	D	E
Saxtons River (Main stem)	Sawdust from 3 plants; untreated dairy and paper mill wastes from 2 sources; untreated sanitary sewage from about 60 employees.	0	12	4	3	0
Sackett's Brook (Main stem)	Untreated paper mill wastes and employee sewage from one plant at Putney, Vermont.	0	5	0	0	1
West River (Main stem)	Sawdust from two mills and untreated dairy wastes from one plants; pollution from 3 tributaries.	0	39	3	3	0
Whetstone Brook (West Basin)	Sawdust from 3 mills.	0	5	3	5	0
Wardsboro Brook (West Basin)	Sawdust from mill at Newfane, Vermont.	0	7	0	2	0
Rock River (West Basin)	Sawdust from mill at East Dover, Vermont.	0	11	0	1	0
Marlboro Branch (West Basin)	Sawdust from mill below Marlboro, Vermont.	0	3	0	2	0
Whetstone Brook (Main stem)	Sawdust from mill at Brattleboro, Vermont, and part of untreated domestic sewage from the village.	0	8	0	0	3

Watercourse	Damages Resulting from Discharge of--	Damages and Extent of Miles				
		A	B	C	D	E
	NEW HAMPSHIRE SUB-BASINS					
Mohawk River (Main stem)	Untreated domestic sewage from 1,600 persons in Colebrook and unsatisfactorily treated sewage from resort hotel in Dixville (Population equivalent of 810).	0	0	11	0	0
Upper Ammonoosuc River (Main stem)	Untreated domestic sewage from 1,400 persons in Groveton; untreated pulp and paper wastes from one mill.	0	32	1	2	0
Israel River (Main stem)	Untreated domestic sewage from 2,280 persons in Jefferson and Lancaster; untreated sewage from 225 persons at resort hotel in Jefferson.	0	10	10	0	0
Johns River (Main stem)	Untreated domestic sewage from 1,600 persons in Whitefield; partially treated sanitary sewage from 150 employees of one plant.	0	3	5	0	0
Ammonoosuc River (Main stem)	Untreated domestic sewage from 12,500 persons residing in Bethlehem, Littleton, Lisbon and Woodsville; untreated or inadequately treated sewage from 2,800 persons at 12 resort hotels, inns, etc., and 18 small private sources; untreated industrial wastes and sanitary sewage from 270 employees in two plants at Littleton.	0	5	40	0	0
Girl Brook (Main stem)	Unsatisfactory septic tank effluent serving 1500 persons in Hanover.	0	1	0	1	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Mink Brook (Main stem)	Untreated domestic sewage from 3,000 persons in Hanover.	0	3	0	0.5	0
Mascoma River (Main stem)	Untreated domestic sewage from 5,800 persons in Enfield and Lebanon; untreated industrial wastes from 6 plants (4 wool textile, 1 tannery, 1 miscellaneous); untreated sanitary sewage from 650 employees in 7 plants.	0	0	26	4	0
Indian River (Mascoma Basin)	Untreated domestic sewage from an undetermined number of private outlets in Canaan.	0	5	3	0	0
Sugar River (Main stem)	Untreated domestic sewage from 10,000 persons in Sunapee, Newport, and Claremont; untreated industrial wastes from 7 plants (4 wool textile, 2 paper, 1 miscellaneous); untreated sanitary sewage from 2,500 employees in 9 plants.	0	0	21	9	0
Croydon Branch (Sugar Basin)	Untreated domestic sewage from private outlets in Newport and Croydon towns.	0	6	6	0	0
Redwater Brook (Sugar Basin)	Untreated domestic sewage from small number of private outlets in Claremont town.	3	1	4	0	0
Ledge Pond Brook (Sugar Basin)	Untreated domestic sewage from small number of private outlets in Newport town.	2	5	2	1	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
South Branch (Sugar Basin)	Untreated domestic sewage from a small number of private outlets in Newport and Goshen towns.	0	3	7	0	0
Ashuelot River (Main stem)	Untreated domestic sewage from 3,400 persons in West Swanzey, Winchester and Hinsdale; primary sewage plant effluent from Keene (population equivalent 9,000); untreated industrial wastes from 10 plants (3 wool textile, 5 paper mill, 1 tannery, 1 chemical); untreated sanitary sewage from 720 employees of 11 manufacturing plants.	0	23	22	0	0
Minnewawa Brook (Ashuelot Basin)	Untreated domestic sewage from 500 persons in Marlboro; untreated industrial wastes from 5 textile mills; untreated sanitary sewage from 175 employees.	0	5	2	0	0
The Branch (Ashuelot Basin)	Pollution transported by Minnewawa Brook.	0	0	3	0	0
South Branch (Ashuelot Basin)	Untreated domestic sewage from 800 persons in Troy; untreated sewage and possibly wool textile wastes from one mill employing 500 persons.	0	2	11	0	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
	MASSACHUSETTS SUB-BASINS					
Millers River (Main stem)	Untreated domestic sewage from 15,100 persons in Athol, South Royalston, Orange, Erving, Millers Falls; untreated industrial wastes from 7 manufacturing plants and possibly 3 others; untreated sanitary sewage from 7,100 employees of 15 plants; pollution transported by tributaries.	0	5	35	0	0
Otter River (Millers Basin)	Sewage plant effluent from Gardner (population equivalent 2,250); untreated sewage from 290 persons in Baldwinsville; untreated industrial wastes from 9 plants; untreated sanitary sewage from 5,100 employees.	0	2	4	6	0
Depot Pond (Millers Basin)	Unsatisfactorily treated institution sewage from Hospital Cottages, Baldwinsville.	0	0	0.5	0	0
Crows Hill Brook (Millers Basin)	Satisfactorily treated effluent from Fernald State School, Templeton town.	0	0.5	2	0	0
Trout Brook (Millers Basin)	Pollution transported by Depot Pond and Crows Hill Brook.	0	2	1	0	0
Deerfield River (Main stem)	From Vermont: untreated domestic sewage from 400 persons in Readsboro and 200 persons in Wilmington (on North Branch). From Massachusetts: untreated domestic sewage from 3,750 persons in Monroe Bridge, Hoosac Tunnel,	0	24	42	4	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Deerfield River (Main stem) Continued	Charlemont, Buckland, Shelhurne Falls, Old Deerfield; primary sewage plant effluent from Greenfield (population equivalent 9,400); untreated industrial wastes and employee sewage from 320 persons in two plants; pollution transported by 2 tributaries.					
Mill River (Main stem)	Untreated domestic sewage from 2,430 persons in Hatfield.	0	14	1	0	0
East Branch North River (Deerfield Basin)	Untreated domestic sewage from private outlets serving 130 persons in Colrain and Foundry Village.	0	10	5	2	0
North River (Deerfield Basin)	Untreated domestic sewage from private outlets serving 110 persons in Griswoldville and Shattuckville; untreated cotten textile wastes from 1 mill; pollution transported by East Branch.	0	0	1	3	0
South River (Deerfield River)	Untreated domestic sewage from private outlets in Conway and Ashfield towns.	0	6	4	0	0
Mill River (Main stem)	Untreated domestic sewage from private outlets serving 300 persons in Williamsburg and Leeds; satisfactory effluent from Hampshire County Sanitarium.	0	6	9	3	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Manhan River (Main stem)	Unsatisfactory sewage plant effluent from Easthampton (population equivalent 5,500 persons); untreated textile wastes from 5 mills; untreated sanitary sewage from 1,200 employees.	0	5	0	4	0
Bachelor Brook (Main stem)	Untreated paper mill wastes and sewage from 200 employees of 1 mill in South Hadley town.	0	8	0	2	0
Lampson Brook (On Bachelor Brook)	Sand filter effluent (population equivalent 80) from plant serving Belchertown village and State school.	0	2	1	0	0
Stony Brook (Main stem)	Untreated domestic sewage from 500 persons in South Hadley; untreated paper mill wastes and sanitary sewage from 200 employees of one mill.	0	1	0	0	2.5
Chicopee River (Main stem)	Untreated sewage from 300 persons in West Wilbraham and North Wilbraham; primary sewage plant effluents from Ludlow, Springfield Indian Orchard plant, and Westover Field (total population equivalent 12,600 persons); untreated industrial wastes from 3 plants and possibly 2 others; untreated sanitary sewage from over 2,500 employees; pollution transported by tributaries.	0	0	8	9	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Quaboag River (Chicopee Basin)	Untreated sewage from 750 residents in Brookfield, West Brookfield, Warren, West Warren, Palmer and Monson Academy; satisfactory effluent from Monson State Hospital; untreated industrial wastes from 5 plants; untreated sanitary sewage from 2,100 employees of six plants; possibly industrial wastes and sewage from 3 other plants.	0	2	11	12	0
East Brookfield and Seven Mile Rivers (Chicopee Basin)	Effluent from Spencer sewage treatment plant (population equivalent 230); untreated textile wastes and sewage from 65 employees of mill in East Brookfield.	0	9	3	0	0
Chicopee Brook (Chicopee Basin)	Untreated domestic sewage from 200 persons in Monson; untreated wastes from 1 textile mill and 1 laundry; untreated sanitary sewage from 500 employees of 3 plants.	0	4	0	3	0
Ware River (Chicopee Basin)	Untreated domestic sewage from 2,700 persons in South Barre, Wheelwright, Gilbertville, Ware, Thorndike, Three Rivers; untreated paper mill wastes from 1 mill; undetermined wool scouring waste treatment effluent from 1 plant; untreated sanitary sewage from 1,000 employees.	0	8	18	9	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles.				
		A	B	C	D	E
Prince River (Chicopee Basin)	Untreated domestic sewage from private outlets serving 1,000 persons in Barre; employee sewage from 200 persons and possibly industrial wastes from 1 plant in Barre.	0	3	3	0	0
Swift River (Chicopee Basin)	Untreated domestic sewage from 1,000 residents in Bondsville.	20	4	4	0	0
Westfield River (Main stem)	Untreated domestic sewage from 21,600 persons in Chester, Huntington, Russel, Westfield, West Springfield, Agawam; untreated industial wastes from 4 paper and 1 textile mills; save-all effluent from 2 paper mills; untreated sanitary sewage from 1,180 employees in 8 plants; pollution from tributaries.	0	42	18	0	0
Westfield Little River (Westfield Basin)	Untreated industrial wastes and sewage from 1,050 employees of 4 plants.	0	18	0	4	0
	CONNECTICUT SUB-BASINS					
Stony Brook (Main stem)	Untreated domestic sewage from considerable number of private sewers.	0	8	2	0	0
Scantic River (Main stem)	Untreated wool dyeing and finishing wastes from one plant; unsatisfactorily treated sewage from 350 employees; pollution transported by Broad Brook.	0	19	0	6	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Broad Brook (Scantic Basin)	Primary sewage effluent from Broad Brook (population equivalent 660); untreated woolen textile wastes and sanitary sewage from 450 employees of one plant.	0	3	0	1	0
Farmington River (Main stem)	Untreated domestic sewage from 7,450 persons in Collinsville, Unionville, Farmington, Poquonock; satisfactory effluents from 5 sewage plants in Simsbury, Avon, Tariffville (population equivalent 1,100); untreated industrial wastes from 3 textile and 1 paper mills; untreated sanitary sewage from 1,520 employees of 11 plants.	0	3	34	10	0
West Branch (Farmington Basin)	Untreated domestic sewage from 200 persons in New Hartford plus pollution transported by Mad and Still Rivers and Manufacturers Stream.	0	12	12	0	0
Still River (Farmington Basin)	Untreated domestic sewage from 6,000 persons in Winsted; untreated industrial wastes from 2 plants; untreated sanitary sewage from 700 employees of 4 plants.	0	8	1	3	0
Mad River (Farmington Basin)	Untreated industrial wastes from 4 plants (plating, textile, chemical); untreated sanitary sewage from 830 employees in 12 plants.	4	0	2	4	0

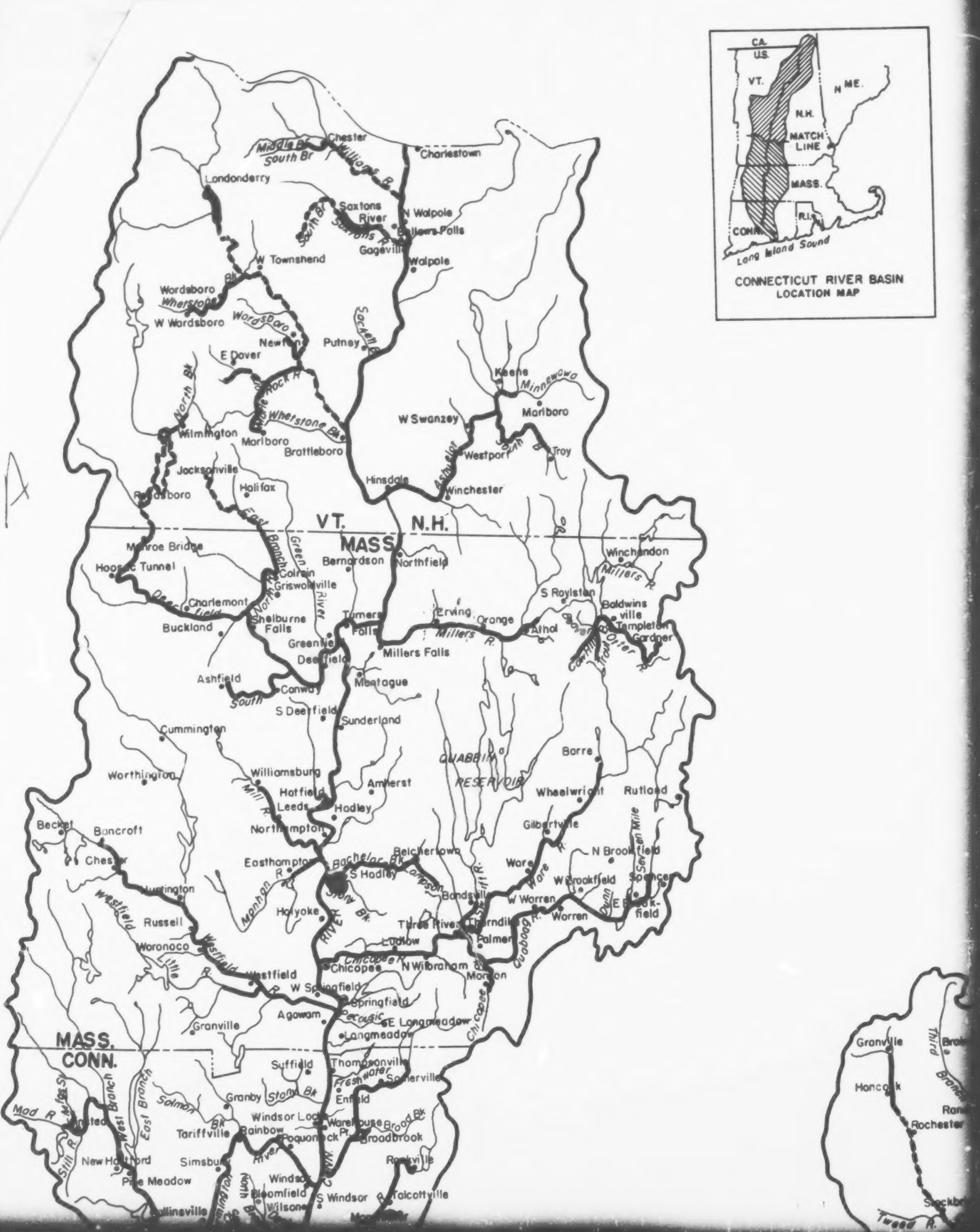
Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Manufacturers Stream (Farmington Basin)	Untreated plating wastes from 3 plants and untreated sanitary sewage from 450 employees at 6 plants.	0	1	0	1	0
Pequabuck River (Farmington Basin)	Satisfactory sewage effluent from Bristol and Plainville (population equivalent 6,500); untreated sewage from private outlets in Pequabuck; untreated plating wastes from 3 plants; untreated sanitary sewage from 55 employees of 3 plants.	4	2	0	12	0
Park River (Main stem)	Untreated plating, pickling and oil wastes from 4 plants.	0	0	0	2	0
North Branch Park River (Park Basin)	Satisfactory sand filter effluent from St. Thomas Seminary sewage plant (population equivalent 40).	0	1	2	0	0
South Branch Park River (Park Basin)	Pollution transported by Piper Brook and Mill Brook.	0	0	0	4	0
Piper Brook (Park Basin)	Untreated metal processing (pickling, cleaning, plating, etc.) from 8 manufacturing plants in New Britain; satisfactory effluent from U.S. Veteran's Hospital.	0	0	0	5	0
Mill Brook (Park Basin)	Satisfactory effluent from Crippled Childrens Home sewage plant.	0	1	2	0	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Hockanum River (Main stem)	Unsatisfactory primary sewage effluents from Rockville, North Manchester and South Manchester (population equivalent 25,700); satisfactory primary treatment effluent from United Homes Housing Authority (population equivalent 180); untreated industrial wastes from 3 paper and paperboard mills; untreated sanitary sewage from 325 employees in 5 plants.	7	1	0	18	0
Lydall Brook (Hockanum Basin)	Untreated industrial wastes from 2 paperboard mills and one plastics plant, plus sanitary sewage from 165 employees.	0	5	0	4	0
Hop Brook (Hockanum Basin)	Untreated paperboard wastes and sanitary sewage from 100 employees of 1 mill.	3	0	0	5	0
Willow Brook (Hockanum Basin)	Untreated industrial wastes from 2 plants and unsatisfactory septic tank effluent from 1 factory.	0	0.5	0	0	0.5
Pewterpot Brook (Keeney Cove on main stem)	Slaughterhouse waste treatment plant effluent and employee sewage septic tank effluent.	0	2	1	0	0
Salmon Brook (Keeney Cove on main stem)	Untreated sewage from private outlets serving 300 persons in Glastonbury; chemical wastes from 1 plant; untreated sanitary sewage from 50 employees of 5 plants.	0	3	0	0.5	0
Hubbard Brook (Main stem)	Satisfactory effluents from two industrial waste treatment plants and two satisfactory employee sewage treatment plants serving 160 persons.	0	2	0	2	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Roaring Brook (Main stem)	Untreated sewage from private sewers serving 100 persons in South Glastonbury; untreated wool textile and employee sewage from 200 persons at one mill; unsatisfactory septic tank effluent from 1 mill employing 30.	0	4	0	2	0
Mattabesset River (Main stem)	Unsatisfactory effluent from New Britain sewage plant (population equivalent 25,800); untreated industrial wastes from 6 metal processing, 2 dairy plants; unsatisfactory septic tank effluents from 4 factories; untreated sewage from 120 employees of one plant.	2	2	0	12	0
Cochinaug River (Mattabesset Basin)	Satisfactory primary effluent from Middletown sewage plant (population equivalent 1,320); untreated silk textile wastes and sewage from 75 employees of 1 plant.	0	12	0	2	0
Sumner Brook (Main stem)	Untreated cotton textile (webbing, belting, etc.) wastes and sanitary sewage from 1,600 employees in 1 plant.	0	6	0	1	0
Candlewood Hill Brook (Main stem)	Untreated industrial wastes from 2 plants plus sanitary sewage from 145 employees of 3 plants.	0	5	0	1	0
Salmon River (Main stem)	Untreated fiberboard wastes and sanitary sewage from 30 employees in 1 plant.	0	11	9	0	0
Pine Brook (Salmon Basin)	Pollution transported by Pocotopaug Brook.	0	2	0	2	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Pocotopaug Brook (Salmon Basin)	Untreated metal processing wastes (plating, pickling, etc.) from 5 plants and sanitary sewage from 500 employees of 7 plants.	0	0	0	2	0
Moodus River (Salmon Basin)	Untreated textile wastes from 2 mills and sanitary sewage from 100 employees of 7 plants.	0	4	0	1	0
Succor Brook (Main stem)	Untreated sanitary sewage from 16 employees of one plant.	0	1	1	0	0
Pattaconck Brook (Main stem)	Untreated domestic sewage from private sewers serving 590 persons in Chester; untreated industrial wastes from 1 laundry; untreated sewage from 45 employees of two plants; septic tank effluent serving 135 employees and metal dust from 1 plant.	0	3	2	1	0
Great Brook (enters Pattaconck Brook)	Untreated industrial wastes from 3 plants; untreated sanitary sewage from 160 employees; effluent from septic tank serving 20 employees.	0	3	0	1	0
Deep River (Main stem)	Untreated industrial wastes (plating, pickling, laundry, etc.) from 3 plants; untreated sanitary sewage from 60 employees; effluents from septic tanks serving 335 employees; untreated domestic sewage from private outlets serving 1,760 persons in Deep River.	0	3	0	2	0

Watercourse	Damages Resulting from Discharge of--	Damages and Extent in Miles				
		A	B	C	D	E
Falls River (Main stem)	Untreated industrial wastes (plating, pickling, garage) from 3 sources; untreated sanitary sewage from 20 employees; effluents from septic tanks serving 990 employees and one source of chemical wastes.	0	5	3	2	0
Mud River (Falls Basin)	Untreated plating wastes from 1 plant; effluents from septic tanks serving 300 employees of 2 plants.	0	2	0	1	0
Rock Creek (Near mouth of Connecticut River)	Unsatisfactory septic tank and dry well serving 30 employees and bottling wastes of 1 plant.	0	1	1	0	0
TOTALS 116 streams	Untreated domestic sewage from 419,000 persons (includes institutions and resorts); untreated industrial wastes from 262 plants; untreated sanitary sewage from 42,500 employees; effluents from municipal sewage plants serving 593,000 persons; effluents from industrial sewage treatment facilities serving 6,200 employees; effluents from 11 industrial waste treatment plants (plus effluents from 7 industrial waste treatment plants not listed).	29	896	787	305	31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CONNECTICUT RIVER BASIN
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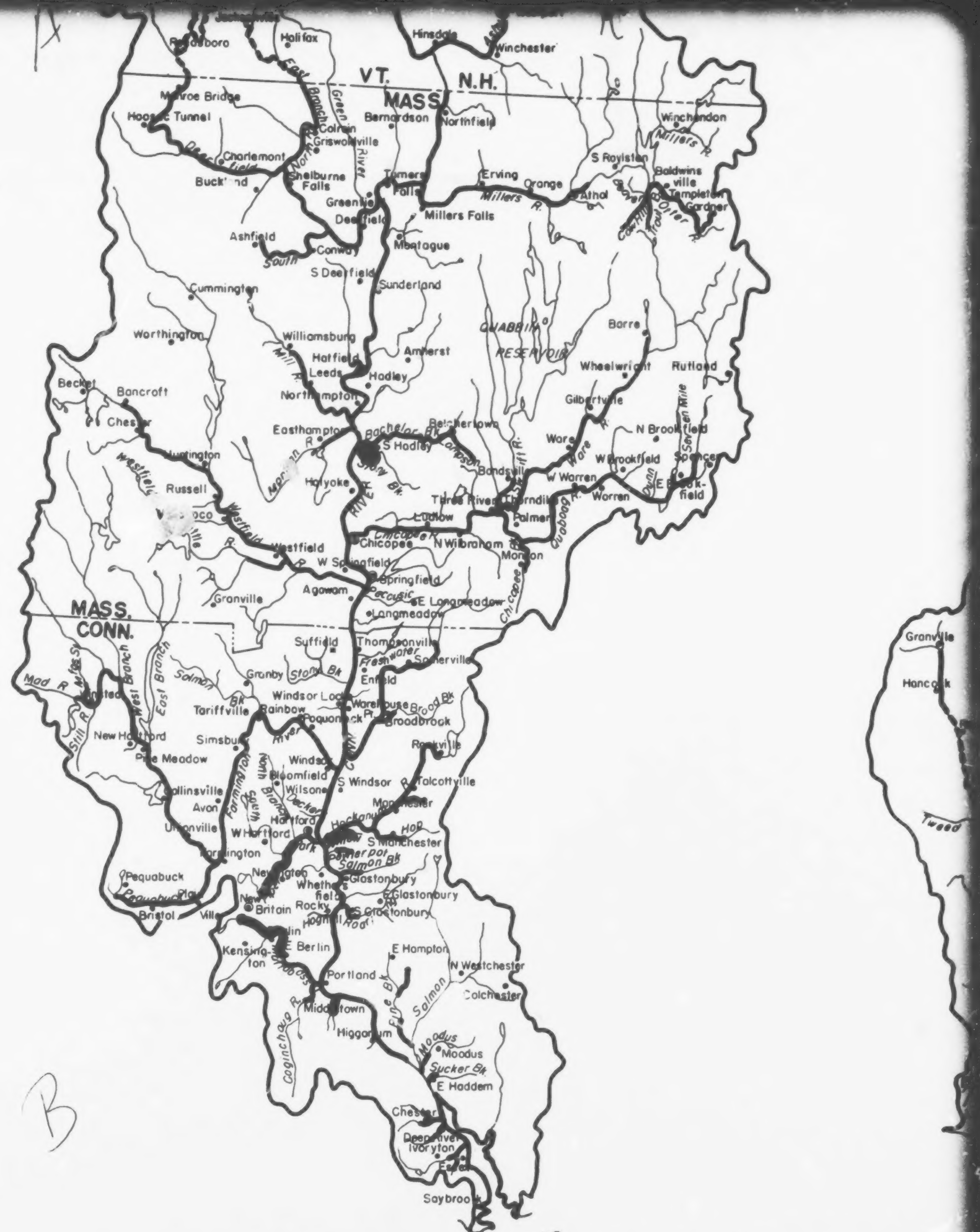

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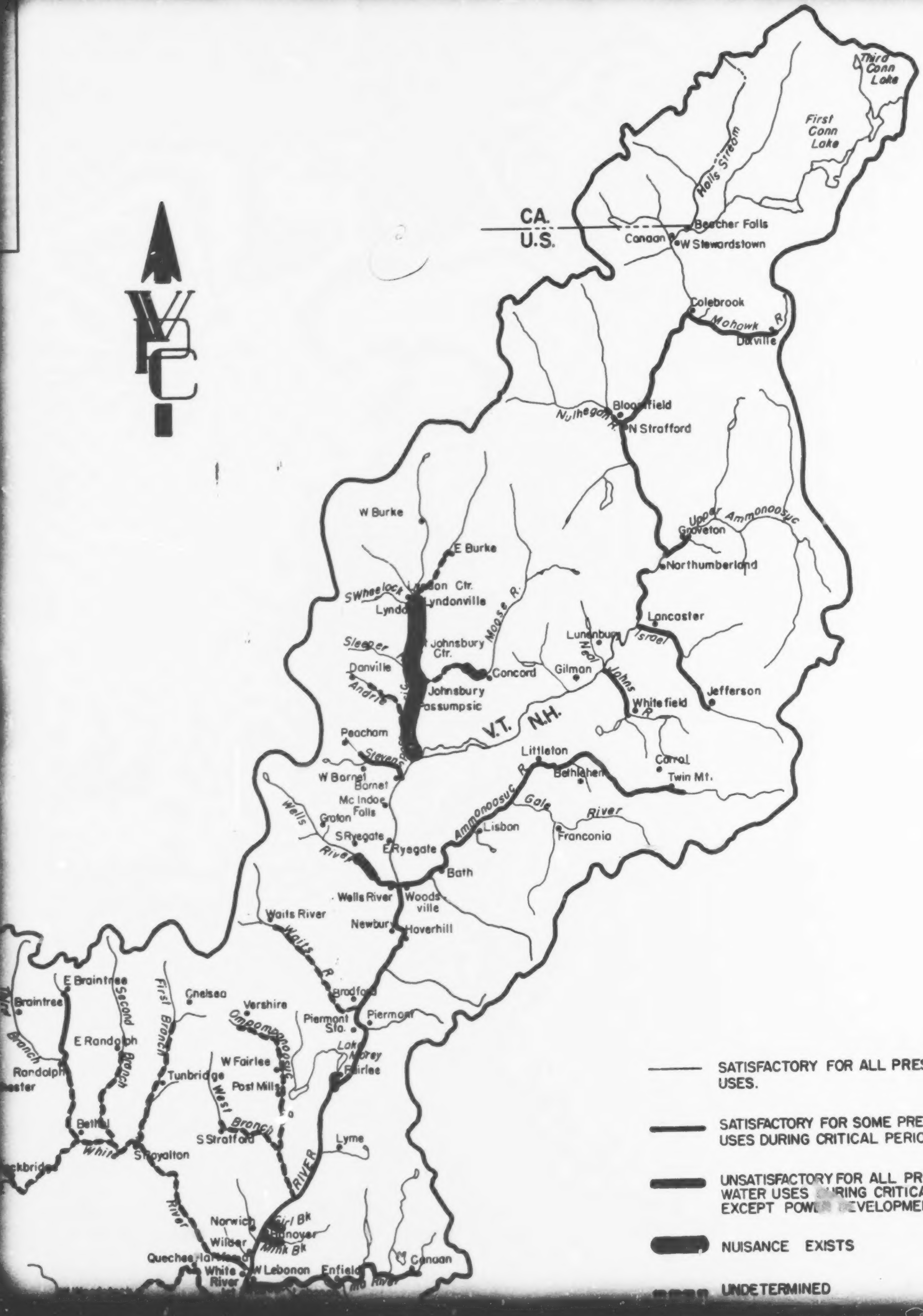CA.
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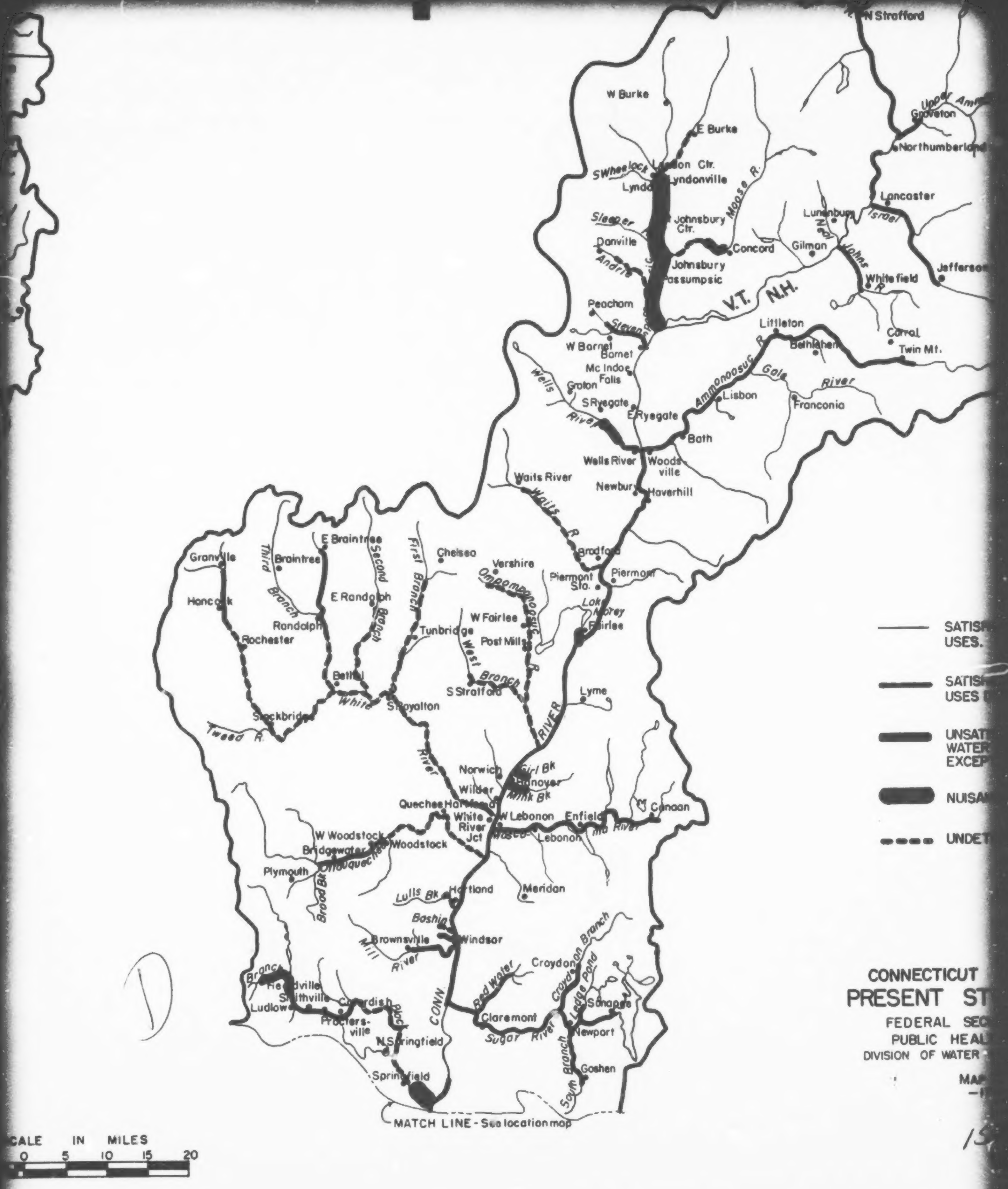
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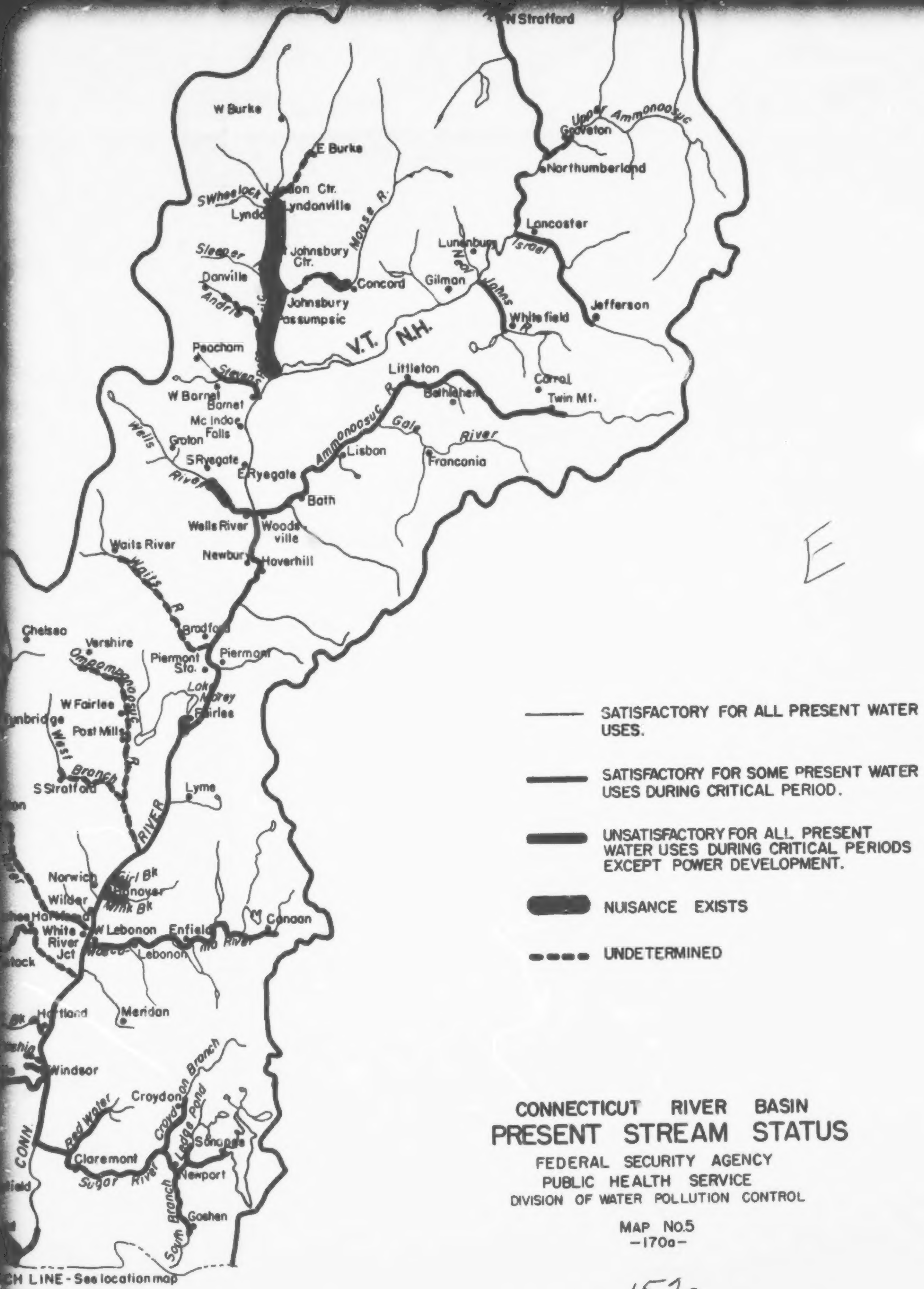
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CONNECTICUT RIVER BASIN

PRESENT STREAM STATUS

FEDERAL SECURITY AGENCY
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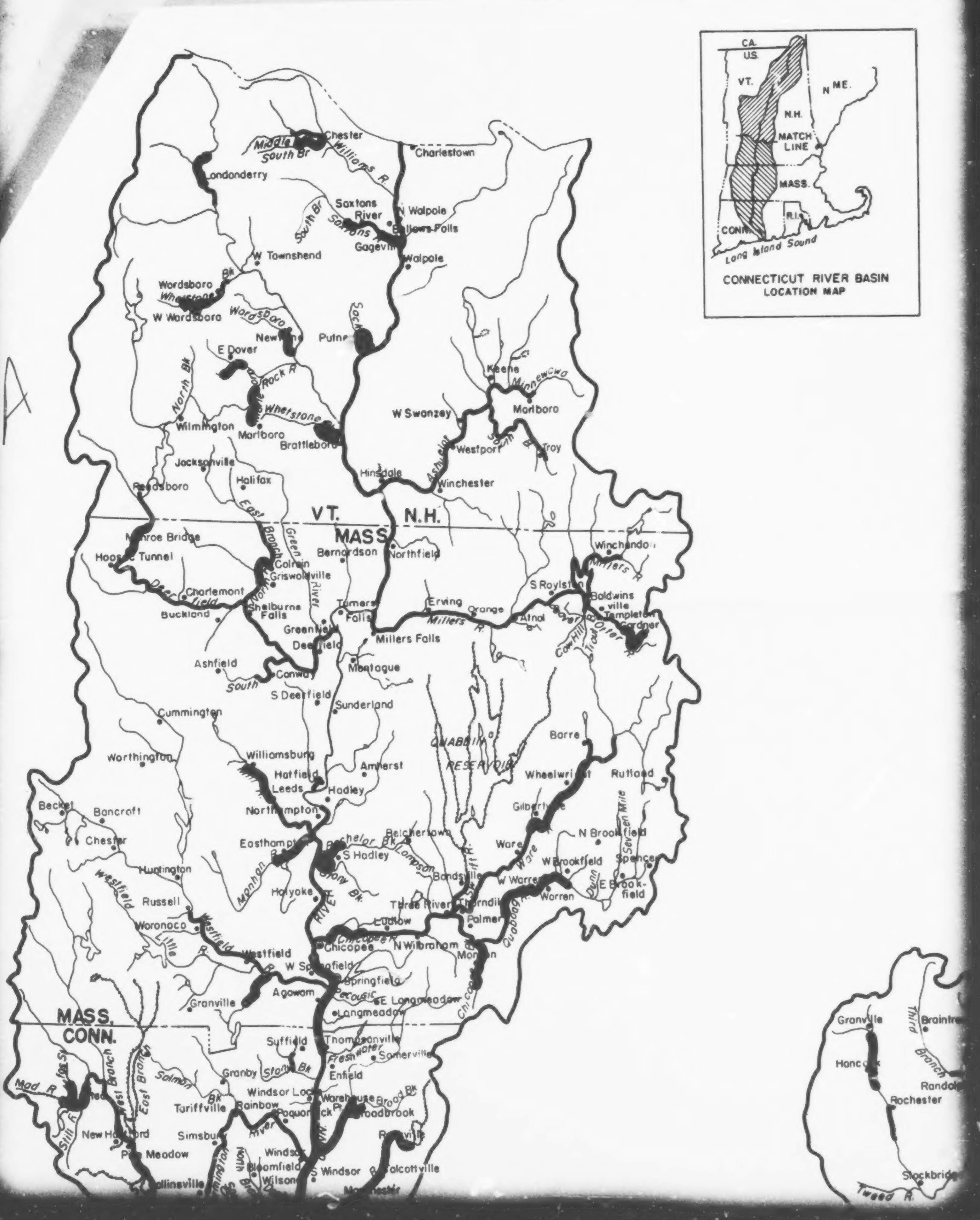
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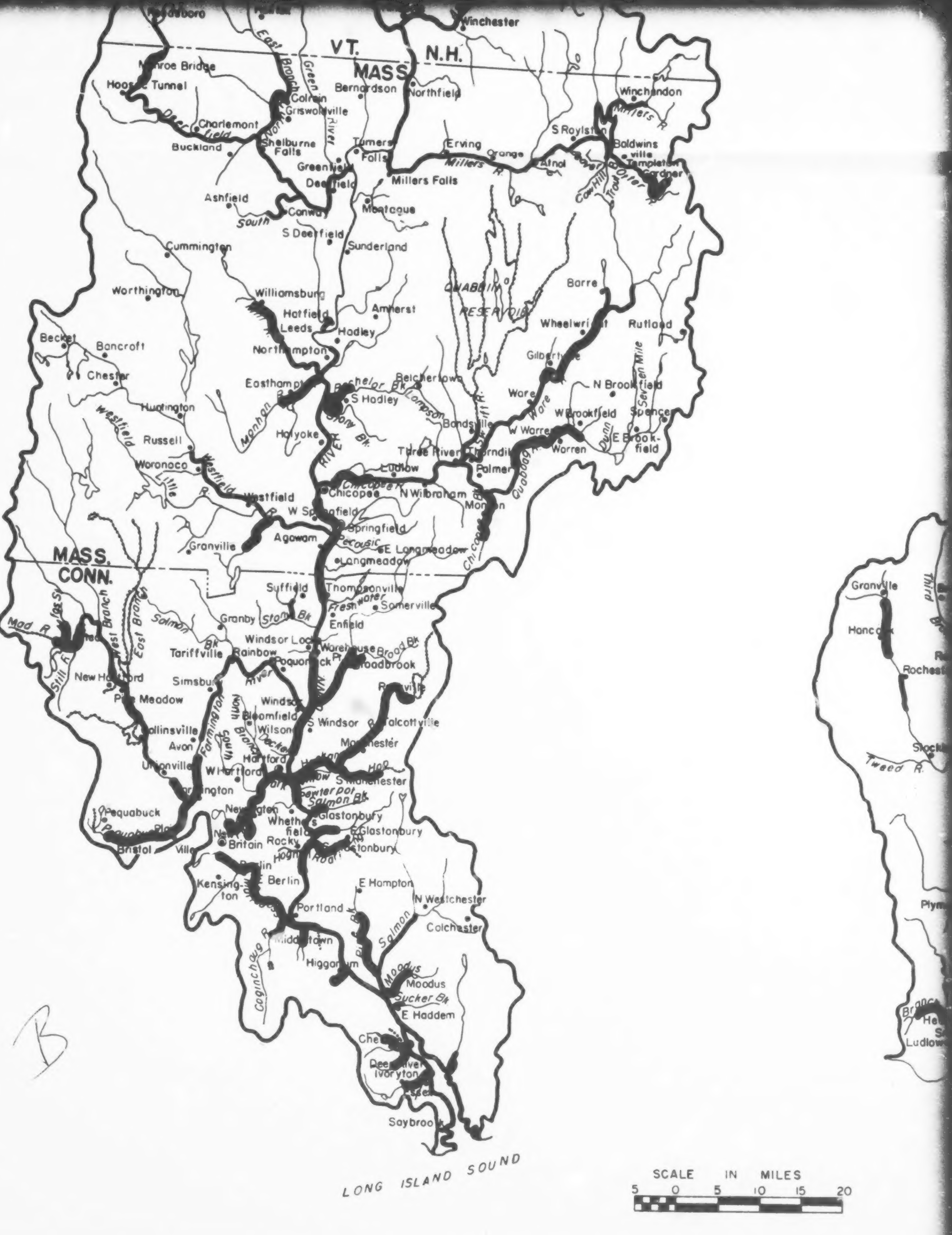
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West Branch
East Branch
Mad R.
Still R.
Windsor Locks
Tariffville
Rainbow
Warehouse Pt.
Broad Bk
Poquonock
Broadbrook
Rockville
New Hartford
Simsbury
River
Pine Meadow
Windsor
Bloomfield
S Windsor
Talcottville
North Branch
Farmington
South
Collinsville
Wilson
Avon
Manchester
Hartford
Unionville
W Hartford
Hop
S Manchester
Farmington
Pewter Pot
Salmon Bk
Pequabuck
Plainville
Newington
Glastonbury
New Britain
Wethersfield
Rocky Hill
E Glastonbury
Bristol
Roaring
Hogan
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Kensington
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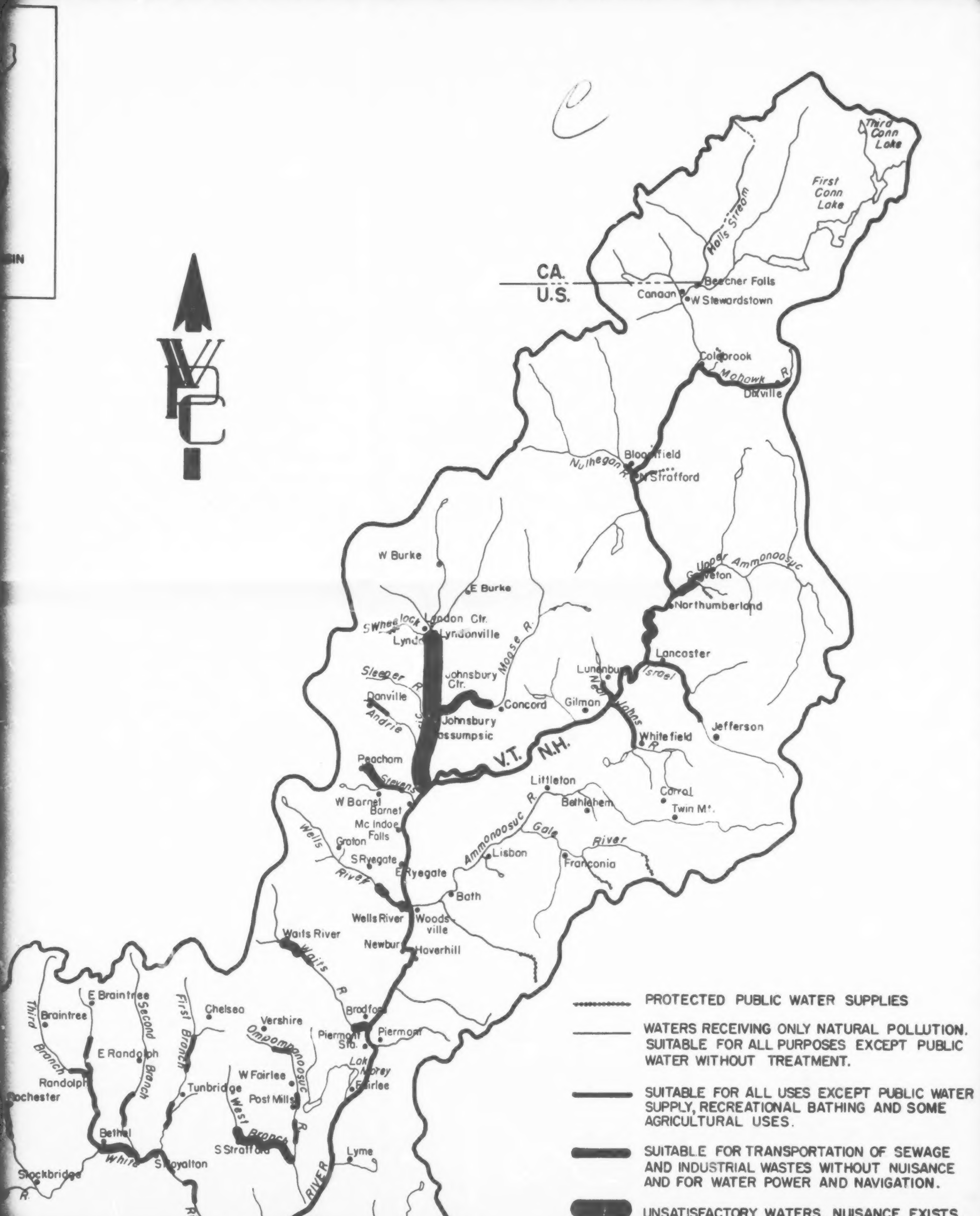
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WATERS RECEIVING ONLY NATURAL POLLUTION. SUITABLE FOR ALL PURPOSES EXCEPT PUBLIC WATER WITHOUT TREATMENT.
SUITABLE FOR ALL USES EXCEPT PUBLIC WATER SUPPLY, RECREATIONAL BATHING AND SOME AGRICULTURAL USES.
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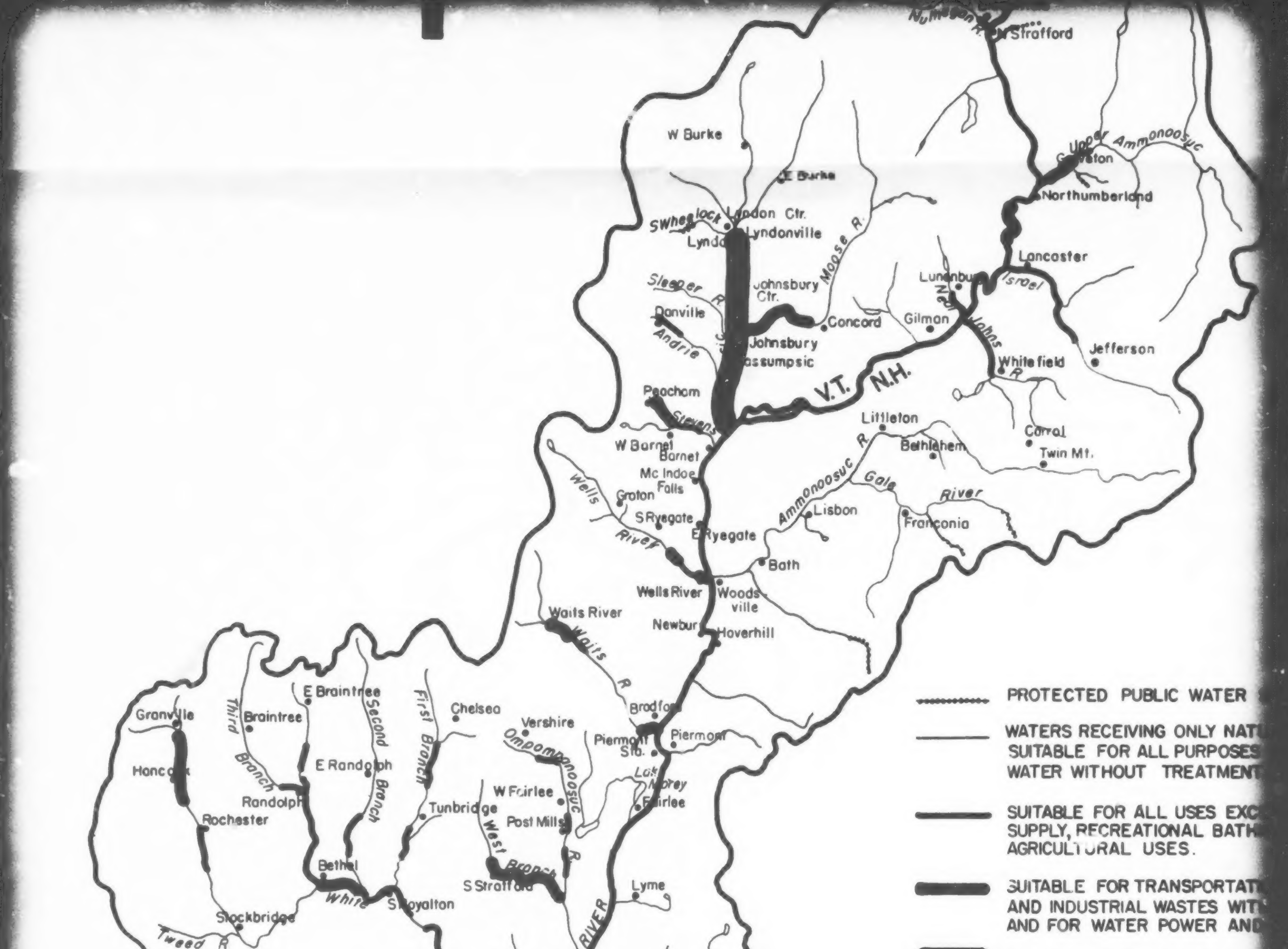
UNSATISFACTORY WATERS, NUISANCE EXISTS.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Bashin
Brownsville
Windsor
Mill River
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D

CONNECTICUT RIVER B

PRESENT STREAM CO

FEDERAL SECURITY AGEN

PUBLIC HEALTH SERVIC

DIVISION OF WATER POLLUTION CO

MAP No.6
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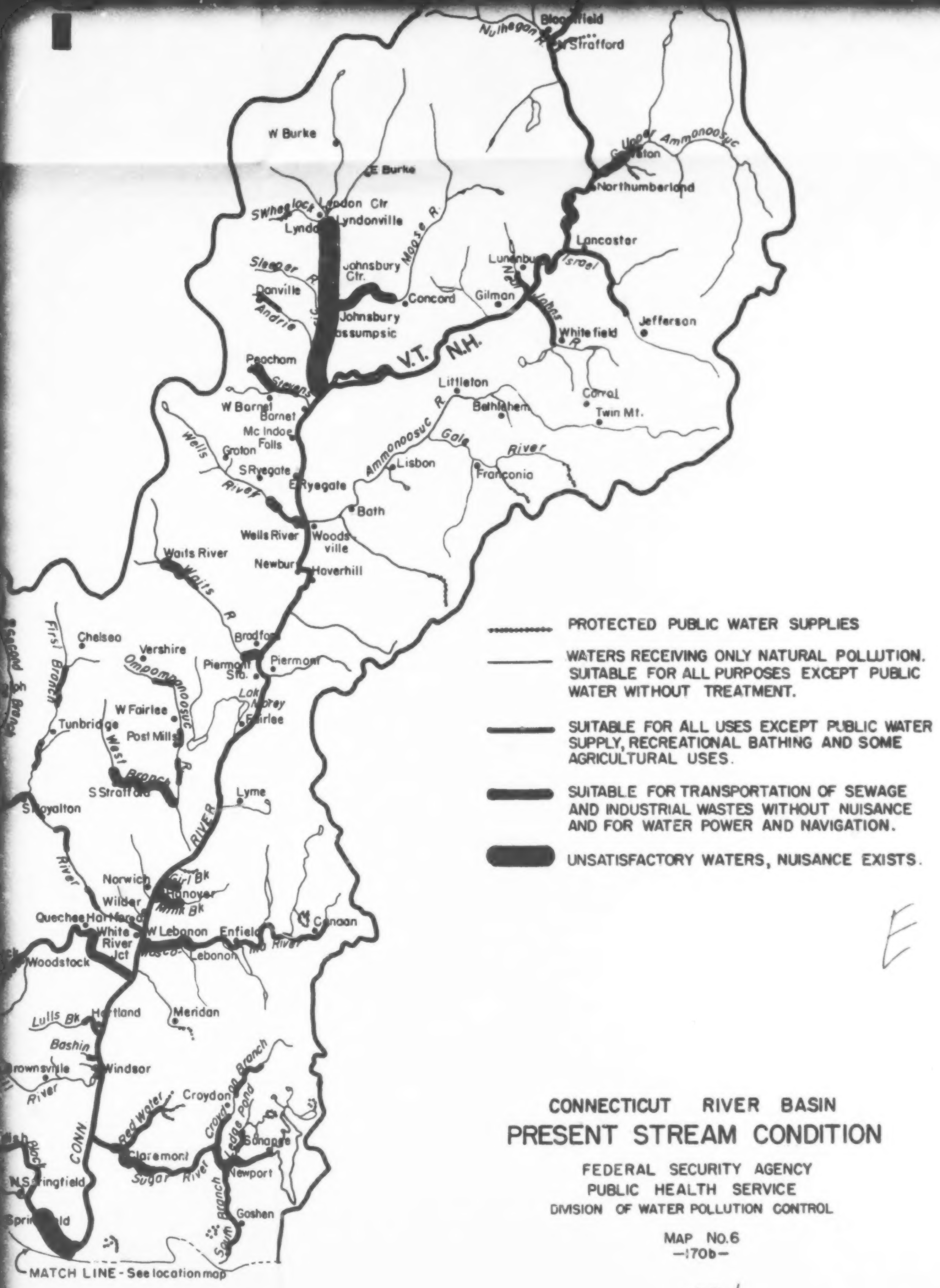
152b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Sunapee
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Sugar River
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N.Springfield
Newport
Springfield
South Branch
Goshen
MATCH LINE - See location map

- PROTECTED PUBLIC WATER SUPPLIES
- WATERS RECEIVING ONLY NATURAL POLLUTION. SUITABLE FOR ALL PURPOSES EXCEPT PUBLIC WATER WITHOUT TREATMENT.
- SUITABLE FOR ALL USES EXCEPT PUBLIC WATER SUPPLY, RECREATIONAL BATHING AND SOME AGRICULTURAL USES.
- SUITABLE FOR TRANSPORTATION OF SEWAGE AND INDUSTRIAL WASTES WITHOUT NUISANCE AND FOR WATER POWER AND NAVIGATION.
- UNSATISFACTORY WATERS, NUISANCE EXISTS.

E

CONNECTICUT RIVER BASIN
PRESENT STREAM CONDITION

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL

MAP NO. 6
—170b—

152b

Losses from Damages to Water Resources by Pollution

Losses from damages to the water resources of the Connecticut River Basin due to pollution have been both real and intangible. The citing of specific cases where economic losses have been incurred is made difficult because few such losses are ever brought to the attention of the water pollution control agencies by aggrieved persons and therefore few records are available. From long experience in the field of water resources within their respective states, however, the water pollution control agencies are cognizant of the fact that pollution has resulted in significant damages.

State and local health departments have records of complaints filed on aesthetic nuisances created by pollution and generally the water pollution control agencies are notified of fish kills by conservation officials or individual observers. Oil spillages that result in serious damage to watercraft and shore installations are generally protested vigorously and occasionally damages are paid for the destruction of farm animals by toxic wastes discharged to streams.

Manufacturers seldom report losses from pollution of sources of process waters. There are a large number of manufacturing establishments that are dependent on streams for process waters. In many instances upstream pollution has forced manufacturers to purchase process water from municipal supplies, to develop ground water supplies at considerable expense, or to install costly water treatment equipment. In addition to the capital investment for water treatment facilities, there is a continuous operational expenditure for materials and personnel. There are occasions, more frequently in the manufacture of fine paper products and in the processing of textile goods, when untreated or inadequately treated polluted process waters cause damages through loss of manufactured product or through increased production costs to recover damaged goods.

Industrial establishments can and do experience a loss from pollution of water resources that is less tangible than increased production costs and loss of product. Manufacturing plants that are known to contribute damages to water resources needed or wanted for other uses suffer a loss in good public relations that may be considerably more damaging than may first appear to be significant. There is little doubt that good public relations are important and represent a commodity of rapidly-rising value on today's market.

There has been a considerable loss to the recreational industry from damages to the water resources from pollution. There has been a considerable recreational development in the basin for many years and more recently this industry has been growing rapidly. In the northern half of the basin, recreation is of large importance to the economy and recreation is generally considered to be the most economical land-water use. The recreation industry has been for the most part a private development and many of the important bodies of water in the northern regions have already been pre-empted for private use. In the central portion of the basin some of the significant lakes and ponds have been set aside for use as public water supplies. This pre-emption of the more important bodies of water has limited the number of such resources for both private and public recreational development and has increased the value of streams for this purpose. It also increases the desirability of constructing multiple-use reservoirs for flood control purposes even though pollution abatement on some tributary streams may be necessary in some cases before the waters are satisfactory for recreational use.

Although streams are of growing importance to present and future recreational use and development, pollution has considerably restricted the number available for this purpose. Many miles of the principal watercourses have been damaged by pollution to an extent where the waters and the abutting lands are unsuitable for any recreational use, whether it be recreational bathing, game fishing, and boating or as sites for camping, picnicking or building of summer homes, inns, resorts and other recreational income property. There are many more miles of the principal watercourses that are damaged by pollution to a lesser extent but are not suitable for recreational bathing. While these are capable of supporting fish life indigenous to the region some are of an aesthetic value too low to be attractive to sportsmen. In this same category belong some of the streams not attradtive to investments in recreational real estate development.

The impact of pollution on recreational waters will become more pronounced as the rapidly growing recreation industry expands and as the clamor for more public facilities increases. As it is now, water pollution, in combination with other factors, has resulted in damages that represent a real loss to recreation. Many miles of potential recreational water are lost to the recreational industry until pollution is abated. This constitutes a loss in recreational income and a loss in value of abutting real estate. It represents a loss of many hours of recreational enjoyment, particularly to those more dependent on public facilities, and results in increased expense to others who must travel greater distances to find suitable water recreational facilities. Fish kills due to pollution not only limit fishing opportunities but also are an appreciable loss in taxpayer's money as the State conservation agencies annually spend many thousands of dollars restocking streams. There is also a real danger to the public health of those who persist in, or resort to, the recreational use of sewage polluted waters unsuitable for this purpose.

Owners of residential and industrial real estate do not usually report losses in depreciation of property values due to pollution of abutting streams or the failure to rent, lease or sell properties located on polluted streams even though such losses have occurred often in the Connecticut River Basin. Industrial real estate located on polluted streams is usually not attractive to new investments in manufacturing that require process waters of good quality and the value of such property is thereby depreciated. Residential real estate that includes a view of water or is convenient to water recreational facilities generally commands a premium price. When pollution damages these aesthetic and recreational advantages the value of such real estate is decreased. The Valuation Engineer of the Connecticut Highway Department has made studies on the effect of polluted waterways on the value of real estate in that State. He found that values were most profoundly affected in the satelite towns of large manufacturing centers. He further found that, "In these towns a polluted waterway almost always results in a slum or substandard neighborhood. If the stream could be cleaned to provide swimming, fishing and boating, even to a restricted degree, it is reasonably probable that the areas abutting the streams would become the best residential districts. This would result in a manifold change in the land price structure....." The cost of damages to the real estate values, industrial and residential, resulting from stream pollution may well prove to be the greatest loss resulting from this cause.

The damages to streams used or needed for agricultural water supplies has not been determined but judging from the number of streams made unsuitable for such purposes it must be significant. The basin supports a large farm animal population, a majority of which is dependent on streams for water supply much of the year. When riparian livestock owners are denied the use of streams they are faced with the inconvenience and expense of deriving water supplies elsewhere. Occasionally the death of valuable livestock is caused by drinking waters polluted by toxic wastes. There is an appreciable irrigation practice in southern Massachusetts and northern Connecticut and efforts to extend this practice is being encouraged. Many of the streams are too polluted to be satisfactory for this purpose and in these cases water supplies for irrigation will have to be developed at considerable cost elsewhere.

In the absence of sufficient information on all the ramifications of costs of lawsuits, depreciated property values, capital expenditures for equipment, repairs, maintenance, loss of product, etc., caused by damages to the water resources from pollution, it is not possible to determine a reasonable dollar value for losses incurred. Neither are there available reliable cost-benefit indexes by which the less tangible damages to water resources, such as loss of opportunities for recreational bathing and game fishing, may be assessed. When reliable data and formulae are available it is estimated that the bill against damages to water resources in the Connecticut River Basin may run into the millions of dollars annually.

There are still other losses caused by damages to water resources from pollution and which deserve serious consideration. Security, well-being, and pride are states of existence that cannot be measured by material standards. Intangible as those values to human existence may appear to be, the majority of citizens strive for their attainment on a personal, community and national level and on which much effort and large sums of monies are expended. Water is one of our most important natural resources, available to us in a relatively fixed quantity. Few realists would deny that damages to our water resources from pollution result in a real loss to individual, community and natural security, spirit of well-being and sense of pride. Such losses cannot be expressed in terms of dollars and cents but efforts to avoid their loss is surely very much worthwhile.

Part 12

BENEFITS RESULTING FROM POLLUTION PREVENTION AND ABATEMENT

General

Benefits that have accrued from past pollution prevention and abatement measures in the Connecticut River Basin have been relatively few. Progress has been made in pollution abatement, particularly in the field of municipal sewage treatment, but the benefits that would normally result have been generally obscured by other sources of pollution existing in the same community or by pollution transported from other communities by watercourses.

There are 212 separate sources of sewage pollution from municipalities, institutions, resorts, schools and airfields and for which 55 sewage treatment facilities have been constructed, 14 of which are known to be inadequate. A total of 1,023,850 persons contribute domestic sewage to watercourses and the treatment facilities reduce this pollutional load by an equivalent of only 326,000 persons. There are 355 known separate sources of industrial waste and sanitary sewage pollution. Only 18 industrial waste treatment plants and 40 sanitary sewage disposal facilities have been provided for such wastes and four of the former and 32 of the latter are providing unsatisfactory treatment. When it is considered that the total pollutional load discharged to watercourses is reduced through treatment by probably less than 15 percent, it can be understood why present benefits from pollution prevention and abatement measures taken have been limited.

The prevention and abatement of sewage pollution in the past has been largely by compulsion through the official activities of the State water pollution control agencies concerned. These agencies have indicated that, unless the cooperation and understanding of the public and industry can be obtained, future measures to control and abate pollution will probably follow much the same pattern. All of the States are embarked on pollution control programs in at least portions of the basin lying within their respective jurisdictions. Rising taxes and construction costs are materially increasing the problems of the water pollution control agencies in affecting sound programs of pollution abatement as municipalities and industries become more reluctant to expend monies for this purpose. It is unfortunate that many of these same municipalities and industries did not provide needed treatment works years ago when first requested to take such action. Most of these treatment works would not only have been paid for today but the basin would have long benefited from their operation.

The Connecticut River Basin stands to gain much through the adoption and completion of a comprehensive stream pollution prevention and abatement program. There has been a steady economic growth in the basin and its continued expansion will depend in goodly measure on the reclamation and conservation of the water resources. There will be economic, health, recreational, and aesthetic benefits as well as many intangible gains.

Benefits from Present Pollution Prevention and Abatement Measures in Effect

The setting aside of certain watershed areas within the basin, and protecting these from pollution by law and inspection, has allowed the development of 92 approved public surface water supplies that serve safe water to 1,034,000 persons residing in 139 communities. This water pollution control measure has benefited the residents of the basin for many years as an important phase of a program of protection to the public health.

Many local health hazards and nuisance conditions have been eliminated or alleviated by requiring the removal or treatment of sewage from private outlets found during surveys made for this purpose. This same program applied to the shores of Long Island Sound has allowed the development of extensive bathing areas from which the residents of the basin have benefited considerably. Sanitary inspections and sampling programs of all public bathing areas are pollution control measures routinely carried out by the State health departments.

Further benefits to the public health and elimination of local nuisance conditions were gained by communities and schools located on small streams by providing adequate sewage treatment works. Construction of some of the larger municipal sewage treatment plants has eliminated gross pollution and in a few instances, after some self-purification, the water becomes satisfactory for most normal uses. Nine communities have provided sewage treatment works from which little benefit accrues because existing facilities are inadequate. This is also true of two institutional sewage treatment plants.

Benefits from industrial waste pollution control measures to date have been very small. Only 18 industrial waste treatment or disposal facilities are in operation and four of these are inadequate in capacity or operation, or both. Manufacturing plants with waste treatment works have made little effort to realize capital gains from recovery of usable by-products or to practice greater utilization of raw materials. Four paper mills recover valuable stock through the use of save-alls and one wool scouring plant recovers crude lanolin. Those manufacturing plants with adequate industrial waste disposal have benefited, however, from improved public relations gained through the completion of their obligations to the community.

While the benefits from the operation of adequate sewage and industrial waste treatment plants are often obscured by other sources of untreated pollution, these facilities do represent a significant benefit in pointing the way towards the completion of a comprehensive pollution prevention and abatement program. In many cases, these existing treatment plants and those under construction will serve to show that treatment facilities can be provided without undue financial hardship and from which significant benefits can be achieved.

Benefits Resulting from Flood Control Measures

Dikes, flood walls and other local protection works have been constructed at nine locations in the lower portion of the basin. Flood water storage dams and reservoirs have been constructed in five localities to date. These flood control measures have benefited the basin by giving partial protection against floods and consequently partial protection against flooding out of water supplies, sewage treatment works and basements with polluted waters, a constant menace to the public health when floods do occur.

A complete system of flood control measures for the Connecticut River Basin is to be jointly considered by the Federal Government, States and local flood control interests. Such a system, including conservation storage reservoirs for increasing flows during critical periods of low run-off, could benefit the public health, improve the water quality during critical periods and, in some instances, result in savings in costs of treatment works required.

Benefits Achievable Through a Comprehensive Pollution Prevention and Abatement Program

There are a significant number of desirable benefits to be achieved from the planning and execution of a comprehensive pollution prevention and abatement program in the Connecticut River Basin. In addition to the immediate benefits that would be of practical value and use to a variety of interests, there would be additional benefits projected into the future through the reclamation and conservation of the water resources for their fullest practicable use. It is not usually predictable when the availability of suitable water resources will be important to the future welfare and economy of a region. On the other hand, it can be predicted with reasonable accuracy that opportunities for development and expansion will not be open to those communities unprepared to offer this vital natural resource.

From the information and data at hand it appears that there are at least 10 significant and worthwhile benefits to be achieved through a comprehensive water pollution prevention and abatement program in the Connecticut River Basin and these follow:

1. There will be a benefit to the public health by the adequate treatment and/or elimination of sources of domestic and industrial sewage pollution by reducing the

chances for water-borne disease infection. Sewage-polluted waters are always a danger to the public health however remote this possibility may appear to be.

2. Long stretches of presently polluted streams, representing the principal waters of the basin, will be made suitable for development by the important recreational industry which could, in turn, result in increased employment, income and economic stability.

3. The abatement of pollution of the principal waters of the basin would allow the development of public recreational facilities by State and local governments. Residents could not only benefit from greater opportunities to participate in the outdoor recreational activities of bathing, boating, fishing, hunting and picnicking, but could realize substantial savings in travel costs as well by having these facilities in the community or nearby.

4. Industries now located in the basin could realize a savings through reduction of present water treatment costs to produce a usable process water and some may find it unnecessary to treat process waters at all. In some localities, industries purchasing water supplied from municipal sources may find stream waters to be of suitable quality and quantity for process purposes. The substitution of available stream waters for purchased municipal supplies by industries would represent a savings in production costs and could relieve water supply demands on those communities faced now or in the near future with considerable costs to develop new sources of public water supply.

5. Large volumes of readily accessible waters at the more desirable industrial locations could be made suitable for the attraction of new industry, resulting in increased employment, income and economic stability.

6. Some of the manufacturing plants now producing industrial wastes could realize a significant savings in production costs or waste treatment costs through recovery of valuable by-products and greater utilization of raw materials.

7. Industrial, residential and recreational real estate located on, or dependent on, presently polluted watercourses would be made more attractive and desirable and considerably increased in value by the abatement of pollution.

8. Aesthetic nuisances created by gross pollution during periods of critical low flows and high temperatures, conditions offensive to both residents and visitors, would be eliminated by pollution abatement.

9. Industries contributing to damages to water resources would experience a worthwhile benefit from improved public relations through abatement of pollution for which they are responsible.

10. Not the least of the benefits to be gained from a sound program of pollution prevention and abatement, and possibly the most important, are the stimuli to the general welfare and well-being of the basin and its citizens. These benefits will be experienced in the security gained from the knowledge that important resources have been conserved, in the pleasures derived from the restoration of the natural beauty of the streams, in the enhanced reputation of the area in the eyes of visitors, in the greater opportunities for all to enjoy and profit by the use of the water resources and in the satisfaction to the public spirit gained through the completion of a community obligation to safeguard the water resources for which it is responsible.

The extent to which these possible benefits will be realized from a comprehensive pollution prevention and abatement program in the Connecticut River Basin will depend to a very large degree on the understanding, cooperation and efforts of the citizens and industries. Without these essential components the abatement program cannot be comprehensive. Those who must contribute to a successful program of pollution abatement are, in the final analysis, the ones who will be most benefited.

Part 13

POLLUTION PREVENTION MEASURES IN EFFECT

General

The numbers of remedial treatment works in operation in the Connecticut River Basin are relatively few and, in some cases, inadequate. For a total of 567 significant sources of sewage and industrial wastes pollution discharged directly to watercourses, 87 treatment facilities are in operation and of these 24 are known to be inadequate. Most of the large sources of municipal sewage pollution are adequately treated, however, and treatment facilities serve nearly two-thirds of the total population. Basic data on sewage and industrial waste treatment facilities are included in Appendix "A" and Appendix "B."

In the past some comprehensive surveys of sources of pollution have been made but from which few treatment works resulted. For the most part sufficient surveys have been made throughout the basin to establish the location of the vast majority of existing sources of pollution and files of the State water pollution control agencies are rather complete in this respect. The States of Connecticut and Massachusetts have for years routinely analyzed catch samples of the principal streams and from which a qualitative estimate of the effects of pollution can be measured. The State of New Hampshire has completed sufficient comprehensive surveys of some streams in the basin to allow the legislature to classify these watercourses into their future intended quality and use and in accordance with which pollution abatement measures can be taken and enforced.

Research on the treatment and disposal of industrial wastes has been and is being carried on. The Connecticut State Water Commission has had working agreements on research with Yale University, Wesleyan University and the University of Connecticut for some time and Massachusetts has for years carried out extensive research at their famous Lawrence Experiment Station. On occasions, industry has sponsored research on common process waste treatment problems.

Although much good work has been accomplished towards a comprehensive pollution prevention and abatement program there is much more that remains to be done. Many surveys and investigations are needed to measure the volume and strengths of polluting materials, to establish all sources of significant pollution, to measure effects of pollution loads and the degree of abatement required to produce the desired water qualities, develop reasonable and equitable treatment methods for industrial wastes when such methods are unavailable, establish the ability of communities and industries to pay for needed treatment works, etc. In Vermont and New Hampshire much of this type of data is required to be established to fulfill the letter of the law and in Massachusetts and Connecticut such data are necessary to the promotion of a sound program and the cooperation of citizens and industry.

The State water pollution control agencies are handicapped in the development of comprehensive pollution abatement programs by a number of factors. All are faced with shortages of personnel and funds for carrying out needed surveys, investigations and research. Until the post-war period only Connecticut had adequate legislation by which to enforce pollution abatement requirements. The rising costs of living and doing business are increasing the resistance of citizens and industry towards providing needed treatment works. Water pollution control agencies do not have sufficient funds for public information programs in the needs for and benefits from pollution abatement. Steps need to be taken by the State governments to provide the State water pollution control agencies with the necessary funds and personnel to carry out comprehensive pollution abatement programs that have the cooperation of the public and industry.

Status of Municipal Sewage Treatment Plants in Operation

There are 37 municipalities served by a total of 35 sewage treatment plants. Several of the municipalities are served by treatment facilities owned by other communities and some municipalities operate more than one sewage treatment works.

Sixteen primary treatment plants provide satisfactory treatment for the present for a total connected population of 441,610 persons and the population equivalent of effluents discharged to watercourses is approximately 224,000 persons. Seven primary treatment plants serving 64,600 persons are inadequate in capacity and discharge unsatisfactory effluents with a total population equivalent of about 47,100 persons.

Ten secondary sewage treatment plants are adequate in design and capacity and serve a total connected population of 55,880 persons. Satisfactory secondary sewage effluents have a population equivalent of approximately 8,200 persons. There are two secondary sewage treatment plants that are inadequate in capacity and design and these serve a total of 83,975 persons. The effluents from these two plants have a combined population equivalent of 31,300 persons.

Table 18, which follows, lists the data on existing municipal sewage treatment plants in operation.

Table 18 -- Census of Municipal Sewage Treatment Plants, Connecticut River Basin 1951

Community 1/	Population Served	Treatment 2/	Status 3/	Effluents P.E. 4/	Effluents Discharged to
CONNECTICUT					
Avon(T)					
Village plant	400	Complete	S	40	Farmington R.
Fuse plant	130	Complete	S	15	Farmington R.
Broad Brook (E.Windsor T)	1,100	Primary 2/	S	660	Broad Brook
Bristol(C)	25,000	Complete 2/	S	3,500	Pequabuck R.
Forestville(V)	(Served by Bristol)				
E.Hartford(T)					
United Homes	300	Primary	S	180	Connecticut R.
Enfield(T)	(Served by Thompsonville)				
Granby(T)	200	Primary	S	120	Salmon Brook
Hartford Metropolitan District	223,840	Primary	S	106,180	Connecticut R.
Hartford(C)	176,960	(Included in Metropolitan District)			
Bloomfield(T)	1,455	(Included in Metropolitan District)			
Newington(T)	50	(Included in Metropolitan District)			
Rocky Hill(T)	1,100	(Included in Metropolitan District)			
W.Hartford(T)	41,220	(Included in Metropolitan District)			
Wethersfield(T)	3,055	(Included in Metropolitan District)			
Manchester(T)					
North	10,550	Primary	U	6,000	Hockanum R.
South	19,200	Primary	U	14,800	Hockanum R.

Table 18 -- Census of Municipal Sewage Treatment Plants, Connecticut River Basin 1951 (Continued)

Community 1/	Population Served	Treatment 2/	Status 3/	Effluents	
				P.E. 4/	Discharged to
CONNECTICUT					
Middletown(C)*					
Conn.R. plant	15,500	Primary	S	8,580	Connecticut R.
Washington St. plant	2,200	Primary	S	1,320	Connecticut R.
New Britain(C)	73,660	Complete	U	25,800	Mattabesset R.
Plainville(T)	250	Complete 2/	S	25	Pequabuck R.
(2 plants)	1,000	Primary 2/	S	600	Pequabuck R.
Rockville(C)	8,200	Primary	U	4,900	Hockanum R.
Rocky Hill(T)					
Drum Hill	650	Primary	U	520	Connecticut R.
Simsbury(T)					
Ensign-Bickford	870	Primary	S	600	Farmington R.
Sewer Ass'n.	1,100	Complete	S	55	Ground water
Tariffville(F.D.)	600	Primary	S	400	Farmington R.
Thompsonville(V)	9,500	Primary	U	10,800	Connecticut R.
(Enfield T)					
Wethersfield(T)	7,000	Primary	S	4,200	Connecticut R.
MASSACHUSETTS					
Amherst(T)	8,000	Primary	S	4,800	Connecticut R.
Belchertown(W.D.)	(Served by Belchertown State School)				
Easthampton(T)	10,315	Complete	U	5,500	Manhan R.
E.Longmeadow(T)	3,000	Complete	S	450	Pecousic Brook

Table 18 -- Census of Municipal Sewage Treatment Plants, Connecticut River Basin 1951 (Continued)

Community 1/	Population Served	Treatment 2/	Status 3/	Effluents	
				P.E. 4/	Discharged to
MASSACHUSETTS					
Gardner(C)	15,000	Complete	S 5/	2,250	Otter R.
Greenfield(T)	15,900	Primary	S	9,440	Green R.
Ludlow(T)	6,500	Primary	S	1,800	Chicopee R.
N.Brookfield(T)	2,000	Complete 2/	S	500	Moore Brook
Spencer(T)	6,000	Complete	S	230	Seven Mile R.
Springfield(C)					
Main plant	133,000	Primary	S 5/	79,800	Connecticut R.
Indian Orchard	16,000	Primary	S 5/	9,600	Chicopee R.
Winchendon(T)*	3,000	Complete	S	1,120	Millers R.
NEW HAMPSHIRE					
Claremont(T)*	9,600	Primary 2/	S	5,700	Sugar R.
Hanover(T)	1,500	Primary	U	1,100	Girl Brook
Keene(C)	15,000	Primary	U	9,000	Ashuelot R.
VERMONT					
None					
TOTALS	646,065			319,465	

* Treatment plant serves part of community; sewer extensions or other project needed to treat all domestic sewage.

1/C-City; F.D.-Fire District; T-Town; V-Village; W.D.-Water District.
2/Treatment includes post-chlorination.
3/S-Satisfactory; U-Unsatisfactory.
4/P.E.-Pollution in equivalent number of persons.
5/Treatment plant satisfactory but chlorination to be required.

Census of Institutional Sewage Treatment Plants in Operation

There are 19 significant sources of pollution classified as institutional and these include two airfields and five private schools. Fifteen of the institutions are served by sewage treatment facilities while four discharge sewage directly to watercourses without treatment. Two of the treatment plants in operation are inadequate in capacity and produce unsatisfactory effluents.

The sewage from 5,460 persons is satisfactorily treated in 10 institutional sewage plants providing secondary treatment and in three primary treatment plants adequately serve 6,800 persons. One primary treatment provides unsatisfactory treatment for 195 persons at one institution and 1,600 persons at one State school and in one municipality are inadequately served by a secondary treatment plant. This is a total of 12,260 persons adequately served by 13 institutional sewage plants, 1,795 persons inadequately served by two treatment facilities and the sewage from approximately 1,100 persons in four private schools is discharged untreated.

Not included in the above discussion is the Putney School which discharges sewage plant effluent to ground water and is not considered a source of stream pollution in this report. It is included in Table 19, however, inasmuch as credit for satisfactory sewage treatment is due.

Table 19 -- Census of Institutional* Sewage Treatment Plants, Connecticut River Basin, 1951

Institution and Location 1/	Population Served	Treatment	Status 3/	Effluents	
				P.E. 4/	Discharged to
CONNECTICUT					
Bloomfield(T)					
St.Thomas Seminary	400	Complete	S	40	N.Branch Park R.
Enfield(T)					
Osborn Prison Farm	175	Complete 2/	S	20	Fresh Water Brk.
Middletown(T)					
State Hospital	4,000	Primary	S	2,400	Connecticut R.
Newington(T)					
Crippled Children's Home	210	Complete 2/	S	20	Mill Brook

Table 19 -- Census of Institutional* Sewage Treatment Plants, Connecticut River Basin, 1951 (Continued)

Institution and Location 1/	Population Served	Treatment	Status 3/	Effluents	
				P.E. 4/	Discharged to
CONNECTICUT					
State Sanitorium	570	Complete 2/	S	60	Unnamed Brook
U.S. Veteran's Hospital	475	Complete 2/	S	50	Piper Brook
Rocky Hill(T)					
Veteran's Home	800	Primary	S	480	Hog Brook
Windsor Locks(T)					
Bradley Airfield	880	Complete	S	95	Connecticut R.
MASSACHUSETTS					
Belchertown(T)					
State School	1,600	Complete	U	480	Lampson Brook
Chicopee(C)					
Westover Field	2,000	Primary	S 5/	1,200	Chicopee R.
Monson(T)					
State Hospital	1,850	Complete	S	170	Quaboag R.
Northampton(C)					
Hampshire Co. T.B. Sanitorium	200	Complete	S	10	Mill River
Templeton(T)					
Hospital cottages	195	Primary	U	120	Depot Pond
Fernald State School	310	Complete	S	20	Trout Brook
Westfield(C)					
State Sanitorium	390	Complete	S	20	Unnamed Brook

Table 19 -- Census of Institutional* Sewage Treatment Plants, Connecticut River Basin, 1951 (Continued)

Institution and Location 1/	Population Served	Treatment	Status3/	Effluents	
				P.E.4/	Discharged to
VERMONT					
Putney(T)					
Putney School	175	Complete	S	0	Ground water

* Includes significant public and private institutions, schools and airfields.

1/T-Town; C-City.
2/Treatment includes chlorination.
3/S-Satisfactory;U-Unsatisfactory.
4/P.E.-Pollution in equivalent number of persons.
5/Present plant satisfactory during normal operations but connection to Chicopee city sewers will be required.

Census of Resort Hotels Having Sewage Treatment Plants in Operation

Sewage from resort hotels is a significant source of stream pollution, particularly in New Hampshire. Thirteen resort hotels and camps are known to discharge sewage to watercourses and five of these have septic tanks in use, none of which provides adequate treatment. One large hotel has a sewage treatment plant that has not been operated recently but is to be renovated and placed in operation during the 1952 season.

The sewage from an average of 2,355 guests and employees of eight resort hotels is discharged directly to watercourses without treatment as is the inadequately treated septic tank effluent from an additional 1,520 persons at five hotels or camps.

Table 20, below, lists the known data on sewage treatment plants at resort hotels and camps in the Connecticut River Basin.

Table 20--Census of Resort Hotels and Camps Having Sewage Treatment Facilities, Connecticut River Basin, 1951

Name of Hotel or Camp	Population Served	Treatment	Status1/	Effluents	
				P.E.2/	Discharged to
NEW HAMPSHIRE					
Carroll town					
Bretton Arms	300	Septic tank	U	270	Ammonoosuc R.

Table 20--Census of Resort Hotels and Camps Having Sewage Treatment Facilities, Connecticut River Basin, 1951 (Continued)

Name of Hotel or Camp	Population Served	Treatment	Status1/	Effluents	
				P.E.2/	Discharged to
NEW HAMPSHIRE					
Carroll town					
Carroll Inn	48	Septic tank	U	48	Ammonoosuc R.
Mt.Washington					
Caddy Camp	70	Septic tank	U	65	Ammonoosuc R.
Mt.Washington Hotel	1,000	None 3/	U	1,000	Ammonoosuc R.
Dixville town					
Balsam Hotel	900	Septic tank	U	810	Mohawk R.
VERMONT					
Fairlee town					
Lake Morey Inn	200	Septic tank	U	180	Unnamed Brook

1/ U-Indicates unsatisfactory treatment facility.
2/ P.E. is pollutional load in terms of equivalent number of persons.
3/ Existing plant not in operation--to be placed in operation in 1952.

Status of Industries Having Sewage and Waste Treatment or Disposal Facilities in Operation

There are 292 manufacturing plants known to discharge industrial wastes directly to watercourses and many of these also discharge sanitary sewage from employees. Fifty-eight manufacturing plants produce no process wastes but dispose of employee sewage directly to streams. Five other manufacturing plants probably produce industrial wastes but these data have not been determined. Of this total of 355 separate sources of pollution, 18 manufacturing plants have provided treatment or disposal facilities, eight of which are satisfactory, four are unsatisfactory and the status of six others is undetermined. Thirteen of the plants discharging sanitary sewage only have provided treatment facilities but only four are satisfactory. Twenty-two of the manufacturing plants that also discharge process wastes have constructed sewage treatment facilities, 12 of these being inadequate.

Data on the strengths and volumes of untreated wastes and effluents discharged are not available in most instances. Table 21, which follows, lists the available data in industrial waste treatment or disposal facilities. Data on industrial employee sewage treatment are omitted from Table 21 but may be determined from Table 14 or Appendix "B."

Table 21--Census of Industrial Waste Treatment or Disposal Facilities, Connecticut River Basin, 1951

Name of Plant or Product Manufactured*	Location	Type of Wastes	Treatment	Status 1/
CONNECTICUT				
Yeamans Plating Corp.	Plainville	Plating	Subsurface disposal	S
Jacobs Mfg. Co.	W.Hartford	Cutting oils and compounds	Flocculation; sedimentation	S
H.L.Roser & Sons	Glastonbury	Tannery	Flocculation; sedimentation; sand, rock filters	S
J.B.Williams Co.	Glastonbury	Chemicals	Flocculation; sedimentation	S
New Britain Gas and Light Co.	New Britain	Tars & oils	Oil separators	S
C. H. Norton Co.	N.Westchester	Fiber board	Save-all	S
E.E.Dickinson Co.	Essex	Witch hazel mfg.	Dilution	S
Russell Jennings Mfg. Co.	Chester	Dust	Dust collection	U
Ernst Bischoff Co., Inc.	Essex	Chemicals	Septic tank	N2/
Lombardo Brothers	E.Hartford	Slaughterhouse	Sand filters	S2/
John Magee Co.	Old Saybrook	Cherry, olive bottling	Sedimentation; dry well	U2/

Table 21--Census of Industrial Waste Treatment or Disposal Facilities, Connecticut River Basin, 1951 (Continued)

Name of Plant or Product Manufactured*	Location	Type of Wastes	Treatment	Status 1/
MASSACHUSETTS				
Cleansing tissues	Becket	White water	Save-all	U
Paper	Russell	White water	Save-all	U2/
Woolen textiles	S.Barre	Scouring and dyeing	Flocculation; sedimentation--Lagoons; biological filters	N2/3/
VERMONT				
Paper	Bellows Falls	Wood pulp mfg	Save-all	N2/
Optical glass	Brattleboro	Grinding compounds	Sedimentation	N2/
Casein	Concord	Milk	Screening, sedimentation	N2/
Refined copper	S.Strafford	Tailings; chemicals	Lagoon	N2/

* Names of manufacturing plants are not given for Vermont and Massachusetts in compliance with established policy.

1/ S-Satisfactory; U-Unsatisfactory; N-Undetermined.

2/ Employee sewage untreated, inadequately treated or disposition unknown.

3/ Has just completed additions to plant and performance undetermined.

Policies of the State Water Pollution Control Agencies

The Massachusetts Department of Public Health administers pollution abatement programs as individual projects wherein river basins or sub-basins are taken as the smallest investigational and survey unit. Surveys are made to locate and measure sources of pollution and investigations made to determine the most suitable methods of disposal. Funds for surveys and investigations are appropriated by the passage of legislative resolves by the General Court to which reports of findings and recommendations for procedure to abate pollution are made. On completion of the necessary studies and rendering of the report, orders may be issued by the State Health Department

-to abate pollution and the manner in which it is to be accomplished is prescribed. The services of consulting engineering firms are sometimes retained to assist in special projects.

The Connecticut State Water Commission executes their water pollution abatement program on a State-wide or industry-wide basis. Treatment of municipal sewage is being required on a population basis regardless of location in the State. The largest cities have been required to provide sewage treatment first and subsequent orders and requests are being issued on the basis of decreasing size of communities. At the present time, all communities having populations of 4,000 persons, or more, have been ordered or requested to construct treatment works.

In Connecticut, the abatement of industrial waste pollution is programmed on an industry-wide basis. Manufacturing plants within the same industry are being ordered or requested to provide waste treatment in order of the magnitude of problems presented. Industrial groups contributing the largest amount of pollution are being required to treat wastes first followed by the other industrial groups in decreasing order of pollution discharged.

The general procedure has been to call representatives from each plant in a given industry into conference with the State Water Commission. The needs for pollution abatement are explained and the problems faced by the industry are outlined. The industry as a group is requested to assist one another in the solution of their common problems. The State Water Commission assists the industries in this program by furnishing technical guidance, investigation of treatment methods, and in commissioning research at Yale, Wesleyan and Connecticut Universities. When studies have been completed and the best practicable methods of treatment have been determined, all plants in the same industry are required to provide treatment.

The New Hampshire Water Pollution Commission was created in 1947 and the Act which created it established a rather well-defined policy and procedure for the control and abatement of pollution by classification of water qualities. In the carrying out of its duties the Commission is instructed to "...determine which classification is for the best interest of the public giving consideration to the health, industrial, economic, geographical and social factors involved." There has been no policy established other than those prescribed by law except a decision to proceed in its classifications from the headwaters of a river basin to the lower waters. The Commission's aims are rather clearly outlined in a statement contained in the Commission's Staff Report on the Sugar River Watershed which pledges "...a solemn responsibility to study and clearly understand the particular problems ... with a view to a reasonable and economical solution..." To carry out the intent of the law the Commission and its staff has generally classified whole watersheds following the appropriate surveys, investigations, hearings and reports.

The Vermont Water Conservation Board was created by the legisture in 1947. Legislation to provide for control of pollution was not passed until 1949 and this was required to be effectively amended in April 1951. The Board does not yet have a full complement of technical personnel to carry out its functions and has not had sufficient time to formulate a permanent policy in pollution abatement. The tentative policy of the Board is to concentrate efforts in the areas requiring greatest attention.

All of the State water pollution control agencies in the basin have adopted the policy that the highest priority be given to the abatement of nuisance conditions created and to petitions for the abatement of conditions of pollution. The States of Massachusetts and Connecticut have adopted a program policy that no sanitary sewage or significant amounts of industrial wastes will be permitted to be discharged to watercourses without treatment.

The Connecticut State Water Commission and the Massachusetts Department of Public Health have established a policy whereby the planned pollution abatement programs will, wherever possible, result in a water quality not less than the "C" classification standard tentatively adopted by the New England Interstate Water Pollution Control Commission. This classification requires that the quality of water be maintained in a condition suitable for recreational boating, irrigation of crops not consumed without cooking, and habitat for wildlife and common food and game fish indigenous to the region. The chemical standards of this water quality will require the maintenance of a minimum concentration of dissolved oxygen of five parts per million; the absence of odor, scum, floating solids, sludge deposits, and phenols or other taste-producing substances; unobjectionable amounts of oil, grease, color, and turbidity; and non-toxic concentrations or combinations of potentially toxic substances. No bacterial standards for this quality of water have been adopted.

State Laws in Effect

All of the States having jurisdiction in the Connecticut River Basin have adequate legislation for the control and abatement of water pollution.

Chapter 195 of the Public Statutes of Connecticut created the State Water Commission and vested in it the enforcement of provisions for controlling pollution of the waters of the State. There are also a number of statutes in Connecticut relating to various phases of water pollution and the enforcement of which is delegated to the State Department of Health. These two agencies act cooperatively in many matters of water pollution control.

The Massachusetts General Court passed appropriate legislation in 1945 for the control and abatement of pollution of the waters of the Commonwealth. Authority for the enforcement of the regulations adopted was vested in the State Department of Public Health and the adoption and execution of pollution abatement programs are carried out by its Division of Sanitary Engineering.

Chapter 166-A, Revised Laws (as inserted by Chapter 183, Laws of 1947) established the New Hampshire Water Pollution Commission and provided it with legislation for the control and abatement of pollution of the surface waters of the State. The law instructs the Commission, following a specified procedure of surveys, investigations, reports and public hearings, to recommend to the legislature classification of the surface waters in the best interests of the public. Following adoption of the classifications by the legislature the Commission is empowered to take whatever steps are necessary to bring the quality of the waters into the specified classification.

Chapter 276 of the Vermont Laws, Acts of 1947, as amended by the Acts of 1949, created the Vermont State Water Conservation Board and various sections thereof, define the policy, membership, tenure of office, records, commissioner, assistants and duties of the Board. The enforcement of the provisions of Chapter 277, Acts of 1943, as amended by the Acts of 1947 and 1949, for the control of pollution of waters is vested in the Water Conservation Board except that the Board's authority shall not infringe upon the powers and duties of the State Board of Health, of local officials in respect to matters of public health nor of the Public Service Commission respecting water used for the development of hydroelectric power. In March, 1951, the Attorney General ruled that the provisions of Chapter 276 and 277 did not apply to sources of pollution existing prior to the enactment of these laws. Legislation was immediately introduced in the legislature to correct this situation and which was passed into law as an amendment in April 1951. The amendment provided that, after the classification of any Vermont water, the Board may take action against any polluter causing deterioration of the water quality below the established classification.

Role of the Connecticut State Department of Health in Water Pollution Abatement

The Commissioner of Health and the Director of the State Water Commission are designated by law as Commissioners in the Interstate Sanitation Commission and as members of the New England Interstate Water Pollution Control Commission. As members of these two interstate compacts, the two State agencies have an interest in and legal authority to plan and execute pollution prevention and abatement programs for tidal, estuarial, coastal and inland waters within or covering portions of the States signatory to the compacts.

The Department, through its Bureau of Sanitary Engineering, and in cooperation with local health officers, has the following specific authorities and interests in stream pollution prevention and abatement.

1. The Department approves all plans for public water supplies, investigates existing water supplies, advises and consults on needs of proposed or existing supplies, and issues orders to protect such water for domestic use after hearings are held.

2. The Department approves all plans for public sewerage systems and sewage treatment plants, is responsible for supervision and inspection of sewage plant operation and certification of operators. It actively participates in programs to promote installation of needed public sewerage and sewage disposal systems.

3. The Department has sanitary supervision of shell fish areas by its authority to license, inspect, and regulate the taking of shell fish.

4. With the local health officers, the Department supervises public bathing water areas. The Bureau of Sanitary Engineering carries out a biannual inspection and sampling program of shoreline bathing waters. Bathing areas are classified bacteriologically and maps of findings furnished to health officers. Under this program, all private sewer outlets have been located, numbered and mapped and many such sources of pollution eliminated.

5. The Department has supervision and control of elimination of local nuisances by its authority to regulate and prohibit obstruction of watercourses, rubbish deposited in streams and nuisance conditions created by filthy water.

6. Chemical, bacteriological, and biological laboratory services are available in the Bureau of Laboratories of the Department of Health.

7. By interpretation of public statutes relating to sewage, pollution of waters, refuse disposal, drainage, water, and ice, the Department has other powers to control and abate pollution.

Interstate Legislation in Effect

All of the States concerned with water pollution in the Connecticut River Basin are signatory to the New England Interstate Water Pollution Control Commission compact. As members, the States pledge to provide abatement of existing pollution and control of future pollution of interstate inland and tidal waters. The compact requires the Commission to make recommendations for legislation deemed advisable and to establish reasonable standards for the classification of interstate waters as to their future intended uses.

A resumé of the State water pollution control laws and the articles of the New England Interstate Water Pollution Control Commission is given in Appendix "C."

Status of Comprehensive Program in Vermont

The Water Conservation Board has not yet acted to abate the sources of pollution in the Connecticut River Basin in Vermont. The Board has located almost all of the sources of pollution and has measured the strengths and volumes of many of the more significant industrial wastes. The water pollution control law specifies that the waters of all reservoirs wholly within the State, used for public water supply and all waters flowing into such reservoirs are to be Class A waters (character uniformly excellent, suitable for public water supply). The law further places all natural lakes and ponds having an area of 20 or more acres, excepting those used for public water supplies, and the waters flowing into such natural lakes and ponds, in Class B (suitable for bathing and recreation; irrigation and agricultural uses; good fish habitat; good aesthetic value; acceptable for public water supply with filtration and disinfection). With the limited staff available, the Board is surveying lakes and ponds in the two classifications above and will continue such activities as necessary to maintain these waters in the quality required by law. As funds and personnel available will permit, the Board will "determine what degrees of purity of the remaining waters of the State should be obtained and maintained in the future to provide the people of Vermont with the maximum beneficial use and enjoyment of such waters."

Although the receiving waters have not been classified, there are four sources of municipal sewage pollution that will most probably require new treatment plants and one resort that will probably require additions to an existing septic tank. There are an additional 19 sources of domestic sewage pollution for which treatment needs remain to be determined.

One manufacturing plant is actively planning to construct a waste treatment plant. One existing plant will probably require enlargement, nine sources may be required to construct new industrial waste treatment facilities, 18 wood processing plants will possibly be required to remove sawdust piles and the needs for treatment facilities at 56 other sources of industrial pollution remain to be determined. With the exception of a new industrial waste treatment plant now in the planning stage at a milk processing plant in South Ryegate, the status of action at all sources of sewage and industrial waste pollution is inactive for the present.

Public water supplies and watersheds are routinely inspected and analyzed by the Vermont State Board of Health.

Status of Comprehensive Program in New Hampshire

The Water Pollution Commission has located almost all sources of pollution in their portion of the Connecticut River Basin and have surveyed a number of streams in accordance with the procedure established by law. Upon recommendation by the Commission the legislature has classified the Wild Ammonoosuc River and tributaries; the Israel River and tributaries, all tributaries to the Johns River; Upper Ammonoosuc River and tributaries; Indian River and tributaries; Zealand River and tributaries; the Little River; the Ammonoosuc River and tributaries; Nash and Perry Streams and their tributaries; and the following brooks and their tributaries--Oliverian, Indian, Bean, Jacobs, Clay, Grant, Camp, Newton, Boston Lot Reservoir, Howes, Bloods, Blow-Me-Down, Eastman, Mill and Phillips Brooks. All of these watercourses have been given high classifications; all or parts of five streams are to be of highest quality for water supply uses after disinfection one stream is to have no objectionable physical characteristics and suitable for all water uses except bathing and water supply without adequate treatment; all other classified streams shall contain not more than 240 coliform bacteria per hundred milliliters and suitable for all uses, including bathing, except water supply without adequate treatment. The Commission has also completed the required studies, investigations and reports on the Sugar River and the recommended classifications are before the current session of the legislature for adoption.

Although all of the necessary surveys have not been completed there is sufficient information to indicate which projects will be required to abate pollution in New Hampshire. It is known or anticipated that 32 sewage projects will be required of 30 municipalities. Of these 32 projects, eight are in the active planning stage, one has final plans approved, 22 projects are in an inactive status for the present, and the type of project to be required in one town has not been determined. Twelve resort hotels require sewage treatment projects, all being in the active planning stage except one at Dixville which is inactive. The Twin Mountain School at Carroll is actively planning the construction of a new sewage treatment facility.

Three manufacturing plants need employee sewage treatment for which projects two plants are actively planning for connection to municipal sewers; one existing sewage treatment facility requires additions on which no action has yet been taken. The needs for treatment at one industrial plant discharging sanitary sewage only have not been determined.

Eighteen projects to abate industrial waste pollution will, or probably will, be required. Four industrial plants are actively planning for connection to municipal sewers, no action to connect to municipal sewers has been taken at seven other plants and four establishments that will need new industrial waste treatment plants have not yet been required to provide projects. Three establishments are actively planning construction of new treatment plants. The needs for 18 other sources of industrial waste pollution have not been determined and for which surveys and investigations are required.

Public water supplies, watersheds and bathing areas are routinely inspected and analyzed by the State Department of Health.

Status of Comprehensive Program in Massachusetts

All public surface water supplies are required to be taken from approved sources and are subject to periodic sanitary inspections and analyses by the Department of Public Health. All new sources of public water supply are required to be approved by the Department and are subject to the same controls for sanitary quality. Public bathing waters are routinely inspected and sampled and their use is approved or disapproved by the State Health Department.

For some years the Division of Sanitary Engineering has carried out a monthly sampling program of the principal streams transporting pollution. The laboratory records of the analysis of these catch samples are on file and are used to classify present stream conditions and to determine, in part, the degree of treatment that will be necessary in a comprehensive pollution abatement program.

During the period 1936--1940 the Department of Public Health conducted comprehensive surveys and rendered reports to the General Court on sources of pollution existing in the watersheds of the Chicopee, Deerfield, Westfield and Millers Rivers, sub-basins of the Connecticut River Basin. Sources of pollution, volume of wastes discharged and the effects of pollution on the receiving streams were measured. Unfortunately very little pollution abatement resulted from these surveys, in part due to obstacles presented by World War II, and much of the data collected does not apply today. However, some of the Connecticut Basin has been resurveyed and almost all existing sources of pollution and some data on volumes and strengths of wastes have been brought up to date. There is also some data available from consulting engineers retained by municipalities and industries.

Forty-three municipalities will be required to construct new sewage treatment plants, 10 will be required to provide satisfactory individual treatment at sources of pollution from numerous private sewers, eight will be required to connect to existing municipal sewerage systems, two existing institutional treatment plants require additions and one treatment plant will need to be replaced by a new plant. Of this total of 64 projects needed to abate domestic sewage pollution, 31 are inactive for the present, 19 projects are in the active planning stage, seven municipalities have final plans for treatment projects approved by the State health department, five municipalities have been requested by the State health department to take action to provide recommended treatment projects, one community is constructing a connection to an existing municipal sewerage system, and the status of action on one project for a new sewage treatment plant is undetermined.

Eighty-seven projects for the abatement of pollution from industry are to be required, 81 for the abatement of industrial waste pollution and six for plants that discharge employee sewage only. Many of the industrial waste treatment projects will also include facilities for employee sewage. Twenty-one of these needed projects for abatement of pollution by industry are in an inactive status, twenty-three projects are in an active planning stage, 13 plants have final plans approved for connection to municipal sewers, 24 industrial plants have been requested by letter from the State health department to start action to provide needed treatment works and the status of five needed abatement projects has not been determined. One project to connect to municipal sewers is under construction.

Status of Comprehensive Program in Connecticut

All public surface water supplies in Connecticut are taken from approved sources and are subject to periodic sanitary surveys and analysis by the State Department of Health. All new sources of public water supply are subject to the same approval and control. All public bathing areas along the shore and many inland areas are routinely inspected and sampled in cooperation with local health officers. Either administrative unit has the power to close bathing areas when warranted by the interests of the public health. Action has been taken to eliminate many private sewer outlets.

The State Department of Health has sanitary supervision of the shell fish areas with the power to grant or revoke licenses. It has for years routinely carried out an inspection and sampling program of the shell fish growing areas and the markets. This public health measure has caused many sources of sewage pollution in shell fish areas to be eliminated.

Engineers of the Health Department make frequent inspections of municipal and institutional sewage treatment works. Much time is spent in training of treatment plants personnel in the interests of good operation. The Department, with the State Water Commission, approves all plans for sewerage and sewage treatment systems and is active in promoting these systems in communities where needed.

For some years the State Water Commission, with the Bureau of Laboratories of the Department of Health, has carried out a monthly sampling program of the streams transporting pollution. These data are on file and are being used to classify present stream conditions and to determine, in part, the amount of pollution abatement required to raise the quality of water to their future intended uses.

The State Water Commission has working agreements with Yale and Wesleyan Universities and the University of Connecticut. From time to time the Commission underwrites studies and research on special problems of pollution abatement. Occasionally, industry sponsors such investigations at these schools.

Studies to determine a satisfactory method for the treatment and disposal of metal plating wastes are currently in progress at Yale University under the sponsorship of the American Electroplaters Society. When a solution to this special problem has been reached, the satisfactory treatment and disposal of such wastes will be required. In the interim, while studies are in progress, the Commission has written each plant discharging electroplating wastes directly to watercourses requesting that certain precautions be practiced until such time as the problem can be reviewed and a more specific program developed.

The Commission, in cooperation with the Bureau of Sanitary Engineering, has made investigations and studies of almost all of the significant sources of domestic sewage pollution and determined the needs for pollution abatement. In other surveys the Commission has located nearly all of the sources of pollution from industry, has measured the volumes and strengths of some industrial wastes and has determined many of the needs for pollution abatement by industry. A considerable amount of data have been accumulated and, while not complete, is sufficient for the Commission to have taken some action to cause abatement of sewage and industrial waste pollution in their portion of the Connecticut River Basin.

From the available data it is indicated that 26 projects to abate municipal sewage pollution are to be required. The State Water Commission has been quite successful in promoting action by municipalities to provide the needed treatment works. Two new sewage plants are under construction; three communities have final plans approved for new plants as has one community for additions to an existing plant; three have final plans approved for connection to other existing municipal sewerage systems; one community is actively planning towards the construction of a new plant and another for additions to an existing plant; four community projects are in the inactive stage; and the status of action for eleven other municipal sewage projects has not been determined. These 26 projects are required for the satisfactory treatment of the sewage from a total tributary population of approximately 166,000.

Information at hand shows a large number of projects to be required of manufacturing plants for the treatment or disposal of industrial sewage and process wastes. A total of 126 projects will be needed, 81 for the treatment or disposal of industrial wastes (and some will include projects for employee sanitary sewage) and 45 sewage disposal projects by manufacturing plants discharging sanitary sewage only. Three new industrial waste treatment plants are currently under construction; two industries are in the active planning stage of providing new industrial waste treatment facilities;

four manufacturing plants have taken no action to provide required treatment works for process wastes; the status of action taken to provide industrial waste treatment or disposal by 72 manufacturing plants has not been determined; and the progress of 44 industrial establishments in providing satisfactory employee sewage treatment or disposal is not known.

Attitudes Towards Pollution Prevention and Abatement

To accurately gage the attitudes of the public and industry towards pollution prevention and abatement is difficult inasmuch as few polls of opinion have been recorded. In many cases, municipalities and industries assert that the cost of construction of treatment works constitutes a prohibitive financial hardship. Many industries declare that the enforcement of pollution abatement orders will cause them to suspend operations or transfer activities to other communities where pollution abatement is not required. There is also a growing expression of opinion that all construction materials should be routed into production for national defense and not in sewage and industrial waste treatment works projects. There is an opposing opinion among water conservationists that national defense is being used as another effort to avoid compliance with pollution abatement orders. It is apparent that there is a lack of understanding of programs for pollution abatement and water conservation.

None of the official water pollution control agencies has a well-developed program of education of the public and industry in the needs for and benefits from pollution prevention and abatement. They do not have sufficient funds for these needed purposes. As a result there has been little community planning and the public remains more or less unorganized. Through the activities of the water pollution control agencies, other State agencies and private organizations it is known that there is a growing demand by the public for pollution abatement, particularly by those interested in greater privileges in all types of water recreation. Were the public organized, understanding of the needs for pollution abatement and their desires made known, there is little doubt that organized, thoughtful support of a comprehensive program of pollution prevention and abatement would be forthcoming.

The programs of pollution abatement in New Hampshire and Vermont, as defined by law to be carried out, will afford some degree of opportunity for education of the public and industry in the needs for pollution abatement. The laws require that hearings be held at which officials may outline the needs for and benefits to be gained from pollution abatement. The hearings will also provide some measure of community planning since the public has some voice in the classification of streams for future intended uses. Even public hearings should be preceded by pertinent informational materials, however, if a sound program of pollution prevention and abatement is to result from the action, and with the consent and cooperation of the citizens and industry.

Part 14

POLLUTION PREVENTION MEASURES REQUIRED

General

The States of Connecticut and Massachusetts are signatory members of the New England Interstate Water Pollution Control Commission, and it is expected that during the current sessions of the legislatures Vermont and New Hampshire will join in the compact. As members all will be committed to a mutually agreeable classification of future intended uses of interstate streams in the Connecticut River Basin.

Some real progress towards comprehensive abatement of pollution has been accomplished and much more needs to be done, particularly in the field of industrial wastes. The official State water pollution control agencies are aware of the needs for a comprehensive pollution prevention and abatement program and the need for a positive, effective approach to the problems involved to insure their expedient and reasonable solution. There is also a real need for helpful cooperation from all with an interest in the use and conservation of the water resources.

Personnel

None of the regulatory agencies responsible for water pollution control has sufficient funds to effectively administer a definitive pollution abatement program. Present technical staffs for survey and investigational work and funds for these purposes are so limited as to require long-term abatement programs. The most undesirable features of long-term pollution abatement programs are the delayed accruement of benefits which, when accomplished, are seldom apparent to those benefited and the difficulty in obtaining and maintaining public support and cooperation over a long period.

The Vermont Water Conservation Board is faced with an additional personnel problem. Present available ratings and salaries for technical personnel are not commensurate with the experience and abilities required of the positions to be filled. Water pollution control personnel should not only be experienced and proficient in the discharge of technical duties, but they should also be sufficiently experienced and capable to command the cooperation and support of the public and industry with whom they must deal. Present salaries of positions open as assistants to the Commissioner of Water Resources appear not to be high enough to attract experienced, qualified personnel.

Public Information and Community Planning

None of the water pollution control agencies has adequate funds for the dissemination of information for the guidance and education of the public and industry in the needs for stream pollution abatement. The Massachusetts State government has shown no inclination to appropriate funds for this purpose. The holding of public hearings as required by New Hampshire and Vermont laws affords a small opportunity for public education and community planning. However, even public hearings should be preceded by the release of informative materials to promote understanding of the problems and to encourage intelligent, representative participation in their solutions.

Funds for the education of the public and industry in the needs for pollution abatement and to promote cooperative community planning in the utilization of the water resources should be considered an essential requirement in the Connecticut River comprehensive water pollution control program. Comprehensive programs are planned programs that should include participation by the public. A sound program of water pollution control planned in the best interests of the majority will generally be supported by the public and industry if they are well informed.

Financing Remedial Treatment Works

Chapters 44 and 83 of the Massachusetts General Laws provide for the financing of sewerage and sewage treatment systems. Cities and towns may incur indebtedness for a period of 30 years within limits of two and one-half and three percent respectively of their taxable valuations. Cities and towns may also finance such works outside constitutional limits by special acts of the legislature. This last is almost always the method of choice since financial institutions generally offer a more favorable interest rate on loans authorized by the General Courts.

In Vermont, sewers and sewage treatment works may be financed by general property taxation within the constitutional debt limit which is ten times the grand list (assessed value of real and personal property plus 100 dollars for each poll divided by 100). State laws also provide for financing such works outside of the constitutional debt limit by the issuing of special revenue bonds or by sewer rental charges based on use of the systems.

Sewers and sewage treatment works may be financed, under Connecticut laws, by general property taxation, front-foot assessments against properties benefited, service charges based on use of the sewerage system, or any combinations of these methods. General obligation or revenue bonds may be issued and indebtedness incurred for these purposes beyond the statuatory limits.

As in Connecticut, the New Hampshire laws relating to the financing of municipal sewerage and sewage treatment projects provide for a general property tax, front-foot assessment against property benefited, service charge based on use of the sewerage system, or a combination of these methods. General obligation or revenue bonds may be issued and indebtedness incurred beyond the statutory limits upon authority of the State legislature. A special feature of the State finance laws relating to the construction of sewerage and sewage treatment works provides that an order to abate pollution issued by the Water Pollution Commission carries with it the legislative authority to finance the needed abatement measures beyond the statutory debt limitations.

Faced with the rising costs of municipal management and keenly aware of the increasing burden on the taxpayers, many officials of cities and towns are becoming more reluctant to urge the expenditure of public funds for needed sewerage and sewage treatment works. It is also true that many elective officials do not regard the construction of sewerage and sewage treatment works with the same benevolence as is usually accorded public parks, schools, libraries, streets, etc. Here again is demonstrated a real need for enlightenment of the public in matters of water pollution control. Sewer outfalls and municipal dumps should not be relegated to the backyard of a community, isolated from the public conscience. The general public must be made to realize its moral obligations in the safe and satisfactory disposal of community wastes and that works and structures for these purposes can be made attractive and a matter of genuine community pride.

Industry generally pleads economic hardship when faced with orders to provide waste treatment measures. Regulatory agencies are often advised by industry that compliance with pollution abatement orders will cause manufacturing plants to cease operations or move into other communities where stream pollution requirements are less rigid or non-existent. However, more than a hundred manufacturing establishments in New England have provided facilities for the treatment and disposal of industrial wastes and all are still actively engaged in competitive fields. There is no record in the Connecticut River Basin of a manufacturing plant having shut down or changed location to the detriment of local employment and income as a result of stream pollution abatement requirements. No manufacturing establishment in the Connecticut River Basin has a moral or legal right to indiscriminately pollute the waterways. The costs of industrial waste treatment are justifiably and correctly applied to production.

Regulatory agencies make every effort to devise and recommend treatment measures that are reasonable and equitable. On the basis of past experience, combined with present-day information, the State water pollution control agencies have arrived at a conclusion that the majority of municipalities and manufacturing establishments in the Connecticut River Basin can provide the degree of treatment required by pollution abatement programs in progress without undue financial hardship.

Legislation

State laws regulating stream pollution in the Connecticut River Basin have proven adequate to date. The Vermont legislature amended the water pollution control law in April 1951 and now, following classification procedure, the law applies to any Vermont water. There is currently before the Massachusetts General Court an Act to clarify the application of laws for the protection of the public health through the prevention of pollution and contamination of waters to governmental agencies.

Pollution Prevention and Abatement Programs in Progress

Definite progress towards pollution prevention and abatement in the Connecticut River Basin has been achieved but much more needs to be done, especially in the field of industrial waste treatment and disposal, if a comprehensive plan for the whole river basin is to be accomplished. More pollution abatement measures have been placed in effect by some States than by others and, conversely, some States have more problems requiring solution.

Surveys have been made in the past and much of the data accumulated needs to be brought up to date. Many other surveys need to be completed to fill all of the gaps in the available information on sources of pollution and the remedial measures to be required. Although in most cases the locations of sources of pollution and the types of waste discharged are known, there is little information on the volumes and strengths of wastes to be treated.

If a comprehensive plan of pollution prevention and abatement is to be applied to the Connecticut Basin a large number of surveys of stream water quality is needed. The effects of pollution discharged, the future intended stream uses, the allowable pollutional load, and the amount of pollution abatement required to result in the desired stream water qualities need to be determined for many watercourses. Such data are required to be determined by the classification procedures contained in the Vermont and New Hampshire water pollution control laws. Connecticut and Massachusetts water pollution control agencies have adopted a similar procedure as sound engineering policy on which to base well-founded pollution abatement programs, provide data for pollution control measures, furnish accurate information for the public at hearings and otherwise, and to support court proceedings when necessary.

A number of industries in the basin produce process wastes for which adequate and reasonable methods of treatment have not as yet been completely developed. Studies to determine the best practicable methods for treating these industrial wastes, together with relative cost data, are needed. Studies are also needed to measure the feasibility of greater utilization of raw materials and recovery of by-products by industry. Such investigations are generally most productive when made cooperatively by industry and the State water pollution control agencies.

The Connecticut State Water Commission is continuing in its program to require treatment or satisfactory disposal of all sources of sewage pollution. The Commission has held hearings with the paper and paperboard industry and when satisfactory methods for treating wastes from this group have been developed all plants will be required to provide treatment. Similar hearings and procedures will be taken with the textile industry in the near future. When satisfactory methods for the treatment of metal plating wastes have been developed plants in this industry will be required to furnish treatment facilities. The Commission's staff, of course, continues investigations and studies of other sources of pollution and the pollution abatement needs.

The Massachusetts Department of Public Health, Division of Sanitary Engineering, is progressing in its program to require treatment of all sources of sewage pollution. There is before the current session of the General Court legislative resolves to authorize surveys of and reports on pollution in the Deerfield and Chicopee River watersheds. When all of the sources of pollution in these two watersheds have been located and measured the amount of pollution abatement needed in a comprehensive program can be determined and the appropriate action to provide the necessary treatment or disposal facilities can be taken. All of the known sources of pollution in the Millers River watershed have been notified to take action to provide recommended treatment measures. Similar notifications are expected to be forwarded to polluters in other watersheds of the Connecticut Basin within the near future.

The New Hampshire Water Pollution Commission is continuing in its surveys, reports and classifications of streams. A considerable number of streams in the Connecticut River watershed have already been classified and the program of requiring pollution abatement measures to bring the quality of these waters within the standards adopted is already under way.

The Vermont Water Conservation Board is handicapped in proceeding with its pollution abatement program by a lack of personnel and funds with which to make the necessary surveys and investigations prescribed by law. The Board will continue to classify the better quality waters in the Connecticut Basin and, as circumstances permit, will make such surveys and classifications of polluted streams as possible after which pollution abatement projects may be required.

Pollution Prevention and Abatement Projects Required

The proposed programs of the official State water pollution control agencies will require a large number of pollution prevention and abatement measures to be placed in effect. Not all the information required in a comprehensive program is at hand but there is sufficient data available on which to determine where a large majority of the projects will be necessary and, in most instances, the type of project required has been determined.

Available data on the pollution abatement programs proposed at this time show requirements for 139 municipal sewage treatment projects. Included in the category of municipal projects are sources of pollution from incorporated or unincorporated municipalities; other legal bodies such as water districts, fire districts, towns; and significant institutions, resorts, recreational centers or other population centers.

Ninety-one of the proposed municipal sewage projects require the construction of new treatment works; 14 projects require additions to, or enlargement of, existing treatment facilities; three existing treatment plants will be required to be replaced with new plants; twelve sources of sewage pollution will be required to connect to municipal sewerage systems; and 19 smaller sources of sewage pollution will be required to provide satisfactory individual treatment of wastes from private sewers.

The sizes of municipalities requiring sewage treatment projects vary considerably in population and number. Of the total of 139 municipalities known to require treatment projects under the proposed program, two have populations of over 50,000; two are in the 25,000 to 50,000 range; seven have populations falling between 10,000 and 25,000; 14 have connected populations of 5,000 to 10,000; 38 vary in size between 1,000 and 5,000; and the majority, 76, have populations under 1,000. In this last population-size group are included all of the small communities that will be required to provide satisfactory individual treatment of sewage discharged from private sewers and most of the resort hotels and institutions requiring sewage treatment projects. The total population to be served by all proposed municipal sewage projects is an estimated 489,600 persons.

There are 34 communities that discharge sewage pollution from a total of approximately 34,400 persons and for which treatment works projects have not been determined. Thirty of these small communities are in Vermont and four are in New Hampshire. When the required stream surveys have been completed and the appropriate water quality classifications established, many of these communities will be shown to require sewage treatment projects.

Current programs for the abatement of industrial waste pollution show a total of 210 projects. New plants are needed for the treatment of process wastes from 110 manufacturing plants. Seventy-eight manufacturing plants will be required to provide facilities for connection to municipal sewers, two of these plants also requiring pre-treatment of industrial wastes before discharge to sewers.

Five of the existing unsatisfactory industrial waste treatment plants need additions or enlargement. In Vermont there is a need for 18 special projects to remove sawdust piles from near the streams and in some of these instances conveying machinery may be needed to prevent future stream pollution from sawdust accumulations.

In addition to the requirements for industrial waste treatment projects, there is also an appreciable requirement of industry to provide satisfactory treatment or disposal of employee sewage. Many of the industries requiring industrial waste treatment also require treatment of employee sewage. In this report, plants requiring treatment of both process wastes and employee sewage are considered to require only one project. However, there are 53 industrial establishments that produce no process wastes but require projects for employee sewage. Of these 53 projects for the treatment or disposal of employee sewage only, 35 require construction of new treatment facilities, nine require connection to municipal sewer systems, and nine require additions to or enlargements of existing unsatisfactory sewage treatment facilities. Compared to the industrial process waste treatment requirements, these needs for treatment or disposal of employee sewage are small but nevertheless significant. Combined, these sources of untreated and inadequately treated employee sewage pollution represent the sanitary wastes from more than 50,000 persons. To safeguard the bacterial quality of the streams in the basin, the State water pollution control agencies have, wherever possible, adopted the policy that no untreated sanitary sewage will be permitted to be discharged directly to watercourses.

There are 78 other sources of pollution from industry in the Connecticut River Basin and for which the need for abatement measures have not been determined. When the required surveys and investigations in New Hampshire and Vermont have been completed the needs for 75 of these sources will be known.

Table 22 lists all of the municipalities and industries in the Connecticut River Basin for which the pollution abatement needs have been determined. Projects for the treatment or disposal of employee sewage only are so indicated under "Remarks." The names of manufacturing establishments in Vermont and Massachusetts are not given in accordance with the established policies of the State water pollution control agencies. Instead, the type of industry discharging pollution is given. Figures 7 and 8, which follow Table 22, show the locations and types of projects needed that have been determined for sources of sewage and industrial waste pollution in the Connecticut River Basin to date.

Table 22 and Figures 7 and 8 follow:

TABLE 22

MUNICIPALITIES AND INDUSTRIES NEEDING IMPROVEMENTS FOR ABATEMENT OF POLLUTION

APRIL 1951

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
VERMONT			
Braintree Town			
E. Braintree Village			
Sawmill	N	Special Project 1/	Sawdust
Bridgewater Town			
Woolen Cloth Mfg.	N	New Plant	
Cavendish Town			
Woolen Mill	N	New Plant	
Chester Town			
Sawmill	N	Special Project 1/	Sawdust
Concord Town			
Casein Mfg.	30,000E	Enlargement of Existing Plant	
Dover Town			
E. Dover Village			
Sawmill	N	Special Project 1/	Sawdust
Fairlee Town			
Lake Morey Inn	200	Addition	
Granville Town			
Sawmill	N	Special Project 1/	Sawdust

1/ Remove sawdust pile.

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Hartford Town			
Wool Cloth Mfg.	N	New Plant	
Hartland Town			
Sawmill	N	Special Project 1/	Sawdust
Londonderry Town			
Sawmill	N	Special Project 1/	Sawdust
Ludlow Town			
Sawmill	N	Special Project 1/	Sawdust
Woolen Mill	N	New Plant	
Smithville Village			
Woolen Mill	N	New Plant	
Marlboro Town			
Sawmill	N	Special Project 1/	Sawdust
Mount Holley Town			
Healdville Village			
Cheese Mfg.	N	New Plant	
Newbury Town			
Wells River Village			
Paper Mill	N	New Plant	
Newfane Town			
Sawmill	N	Special Project 1/	Sawdust
Peacham Town			
Sawmill	N	Special Project 1/	Sawdust
Plymouth Town			
Sawmill	N	Special Project 1/	Sawdust

1/ Remove sawdust pile.

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Rockingham Town			
Saxtons River Village			
Sawmill	N	Special Project 1/	Sawdust
Ryegate Town			
S. Ryegate Village			
Cottage Cheese Mfg.	65,000E	New Plant	
Springfield Town			
Woolen Mill	N	New Plant	
St. Johnsbury Village	7,250	New Plant	
Dairy	150E	New Plant	
Stockbridge Town			
Sawmill	N	Special Project 1/	Sawdust
Topsham Town			
Waits River Village			
Sawmill	N	Special Project 1/	Sawdust
Wardsboro Town			
Sawmill	N	Special Project 1/	Sawdust
Sawmill	N	Special Project 1/	Sawdust
W. Wardsboro Village			
Sawmill	N	Special Project 1/	Sawdust
W. Windsor Town			
Brownsville Village			
Sawmill	N	Special Project 1/	Sawdust

1/ Remove sawdust pile.

TABLE 22 (Continued

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
NEW HAMPSHIRE			
Bethlehem Town	5,000E	New Plant	
Carroll Town	180E	Individual Treatment	
Mt. Washington Hotel	1,000	Additions	Chlorination
Bretton Arms Hotel	300	Additions	Chlorination
Mt. Washington Caddy Camp	70	Replacement	
Crawford House	420	New Plant	
Fabyan Hotel	375	New Plant	
Twin Mountain Hotel	181	New Plant	
Rosebrook Inn	65	New Plant	
Wayside Inn	45	New Plant	
Y-D Cabins	42	New Plant	
Twin Mt. School	70	New Plant	
Carroll Inn	48	Additions	
Crawford Garage	15E	New Plant	
Charlestown Town	700	New Plant	
Claremont City	9,600	Additions	
Claremont City	N	Individual Treatment	
Claremont Waste Mfg. Co.	470	Connection to Municipal Sewer	
Claremont Paper Co.	1,345	Connection to Municipal Sewer	
Joy Mfg. Co.	325E	Connection to Municipal Sewer	Sanitary Sewage Only

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Claremont City			
Dartmouth Woolen Mills	9,700	Connection to Municipal Sewer	
Coy Paper Co.	382	New Plant	
Colebrook Town	1,600E	New Plant	
Croydon Town	N	Individual Treatment	
Dixville Town			
Balsam Hotel	900E	Additions	Chlorination
Enfield Town	300E	New Plant	
American Woolen Company	N	New Plant	
Goshen Town	N	Individual Treatment	
Hanover Town (Girl Brook)	1,500E	Addition	
Hanover Town (Mink Brook)	3,000E	New Plant	
Haverhill Town			
Woodsville Village	3,000E	New Plant	
Hinsdale Town	1,400E	New Plant	
Jefferson Town	180	Individual Treatment	
Waumbec Hotel	225	New Plant	
Keene City	15,000E	Additions	
Lancaster Town	2,100E	New Plant	
Lebanon Town	5,500E	New Plant	
W. Lebanon Village	1,000E	New Plant	
American Woolen Co.	N	Connection to Municipal Sewer	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Lebanon Town			
E. Cummings Leather Co.	N	Connection to Municipal Sewer	
Densmore Brick Co.	N	Connection to Municipal Sewer	
Lebanon Woolen Mills Co.	N	Connection to Municipal Sewer	
Mascoma Woolen Mills Co.	N	Connection to Municipal Sewer	
Littleton Town	3,000	New Plant	
Saranac Glove Co.	122E	Connection to Municipal Sewer	
Norton Pike Co.	N	Connection to Municipal Sewer	
Lisbon Town	1,500E	New Plant	
Marlboro Town	500E	New Plant	
Newport Town	5,000	New Plant	
(Croyden Branch)	N	Individual Treatment	
(Ledge Pond Brook)	N	Individual Treatment	
(South Branch)	N	Individual Treatment	
Brampton Woolen Co.	5,750	Connection to Municipal Sewer	
International Shoe Co.	100	Connection to Municipal Sewer	Sanitary Sewage Only
Dorr Woolen Co.	10,025	New Plant	
A. Caplan Dusting Mill	N	New Plant	
Northumberland Town	100	New Plant	
Groveton Village	1,400	New Plant	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Northumberland Town			
Wyoming Valley Paper Mills Inc.	N	New Plant	
Groveton Papers Co.	N	New Plant	
Swanzey Town			
W. Swanzey Village	1,000E	New Plant	
Troy Town	800	New Plant	
Walpole Town	900	New Plant	
N. Walpole Village	200	New Plant	
Whitefield Town	1,600E	New Plant	
Mellin Quincy Mfg. Company, Inc.	N	Additions	Sanitary Sewage Only
Winchester Town	1,000E	New Plant	
MASSACHUSETTS			
Agawam Town	5,700	New Plant (pumping station to Springfield main plant)	
(Westfield River Section)	1,500	New Plant (pumping station to new plant)	
Ashfield Town	150E	Individual Treatment	
Athol Town			
Municipal System	10,000E	New Plant	
Private Sewers	1,485	New Plant	Connection to Municipal System
Drills and Tools	N	Connection to Municipal System	
Saws and Tools	N	Connection to Municipal System	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Athol Town			
Coated Textiles	N	Connection to Municipal System	
Toys and Boxes	N	Connection to Municipal System	
Barre Town	1,000	New Plant	
Drill, Tapping Machine	N	Connection to Municipal System	
S. Barre Village	75	New Plant	
Becket Town			
Bancroft Village			
Cleansing Tissue	1,700	Additional Save-Alls	
Belchertown Town			
Belchertown State School	1,600	Additions	Chlorination
Brookfield Town	50	New Plant	
Paper Coaters	N	Connection to Municipal System	
Buckland Town	1,055	New Plant	
Charlemont Town	500E	Individual Treatment	
Chester Town	200	New Plant	
Abrasives	33E	Connection to Municipal System	Sanitary Sewage Only
Chicopee City	41,950	New Plant	
Rendering Company	N	Connection to Municipal System	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Chicopee City			
Brewing Co.	N	Connection to Municipal System	
Slaughter House	N	Pretreatment and Connection to Municipal System	
Sporting Arms	N	Connection to Municipal System	
Rubber Tires	N	Connection to Municipal System	
Westover Field	2,000	Addition	
Colrain Town	72E	Individual Treatment	
Foundry Village	60E	Individual Treatment	
Griswoldville Village	80E	Individual Treatment	
Shattuckville Village	28E	Individual Treatment	
Cotton Mill	N	New Plant	
Conway Town	200E	Individual Treatment	
Deerfield Town	1,160E	New Plant	
S. Deerfield Village	1,800E	New Plant	
Easthampton Town	10,315	Replacement of Existing Plant	
Textile Mill	N	Connection to Municipal System	
Textile Mill	N	Connection to Municipal System	
Rubberthread Mfg.	N	Connection to Municipal System	
Felt Mill	N	Connection to Municipal System	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Easthampton Town			
Webbing Mill	N	Connection to Municipal System	
Mt. Tom Section	200E	New Plant (Pumping Station to Easthampton Plant)	
Erving Town	300	New Plant	
Paper Mill	N	New Plant	
Wood Shoe Heels	50E	Connection to Municipal System	Sanitary Sewage Only
Millers Falls Village			
Paper Mill	N	New Plant	
Tool Mfg.	N	Connection to Municipal Plant	
Florida Town			
Hoosac Tunnell Village	50E	Individual Treatment	
Gardner City			
Stove Mfg.	N	Connection to Municipal System	
Metal Plating	N	Connection to Municipal System	
Cribs & Cradle Mfg.	N	Connection to Municipal System	
Furniture	N	Connection to Municipal System	
Furniture	N	Connection to Municipal System	
Furniture	N	Connection to Municipal System	
Oil Storage	N	Connection to Municipal System	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Hardwick Town			
Gilbertville Village	400	New Plant	
Wheelwright Village	100	New Plant	
Facial Tissue Mfg.	N	New Plant	
Hatfield Town	2,430	New Plant	
Holyoke City	53,750	New Plant	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Huntington Town	1,000	New Plant	
Woolen Mill	1,600	Pretreatment and Connection to Municipal System	
Longmeadow Town	5,790	New Plant	

TABLE 22 (Continued

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Monroe Town			
Monroe Bridge Village	50	Individual Treatment	
Paper Mill	N	New Plant	
Monson Town	200	New Plant	
Monson Academy	N	New Plant	
Woolen Mill	N	New Plant	
Laundry	N	Connection to Municipal System	
Toilet Seat Mfg.	N	Connection to Municipal System	
Montague Town	3,180	New Plant	
Turners Falls Village	4,780	New Plant	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Northfield Town	50	New Plant	
Mt. Hermon School	500	New Plant	
Northfield Seminary	500	New Plant	
Northampton City	29,000	New Plant	
Sulphite Pulp	N	New Plant	
Leeds Village	200	New Plant	
Orange Town			
Municipal System	4,000	New Plant	
Private Sewers	960	New Plant	Connection to Municipal System

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Orange Town			
Iron Castings	N	Connection to Municipal System	
Valve Machines	N	Connection to Municipal System	
Bicycle Parts	N	Connection to Municipal System	
Palmer Town	500	New Plant	
Brushes & Mops	N	New Plant	Sanitary Sewage Only
Steel Wire	N	New Plant	
Thorndike Village	800	New Plant	
Three Rivers Village	1,200	New Plant	
Bondsville Village	1,000	New Plant	
Royalston Town			
S. Royalston Village	150	New Plant	
Russell Town	1,000	New Plant	
Paper Board Mill	1,173	New Plant	
Paper Mill	189	Connection to Municipal System	
Woronoco Village			
Paper Mill	16,375	New Plant	
Shelburne Town			
Shelburne Falls Village	900	New Plant	
South Hadley Town	500	New Plant	
Paper Mill	N	Connection to Municipal System	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
South Hadley Town			
Paper Mill	N	New Plant	
S. Hadley Falls Village	6,860	New Plant	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Springfield City			
Undetermined Industrial	N	New Plant	
Plastics Manufacturing	N	New Plant	
Resins Manufacturing	N	New Plant	
Sunderland Town	N	New Plant	
Templeton Town			
Hospital Cottages	195	New Plant	
Baldwinsville Village	288	New Plant	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	
Ware Town	N	New Plant	
Undetermined Industrial	N	Connection to Municipal System	
Warren	100	New Plant	
Pump Manufacturing	67	Connection to Municipal System	Sanitary Sewage Only
W. Warren Village	50	New Plant	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Warren			
Textile Mill	2,000	Connection to Municipal System	
Textile Mill	450E	Connection to Municipal System	
Cotton Mill	N	Connection to Municipal System	
Textile Mill	N	Connection to Municipal System	
W. Brookfield Town	50	Individual Treatment	
Wire Company	N	New Plant	
Yeast Plant	N	New Plant	
Westfield City	18,790	New Plant	
Paper Mill	N	Connection to Municipal System	
Thread Mill	N	Connection to Municipal System	
Textile Machines	N	Connection to Municipal System	
Bicycles	N	Connection to Municipal System	
W. Springfield Town	9,140	New Plant 1/	
W. Springfield Town	8,000	New Plant 1/	
Paper Mill	N	Connection to Municipal System	
Paper Mill	N	Connection to Municipal System	

1/ Pumping station to Springfield main plant.

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Wilbraham Town			
W. Wilbraham Village	200	New Plant	
N. Wilbraham Village	100	New Plant	
Plastic Housewares	N	New Plant	
Drawn Wire & Rod	N	New Plant	
Williamsburg Town	100	New Plant	
Winchendon Town	1,120	New Plant	Connection to Municipal System
Cotton Mill	N	Connection to Municipal System	
Wood Toys & Chairs	N	Connection to Municipal System	Sanitary Sewage Only
Bobbins & Spools	N	Connection to Municipal System	Sanitary Sewage Only
Woodworking Machinery	N	Connection to Municipal System	
CONNECTICUT			
Berlin Town			
Lower Lane Dairy	N	New Plant	
Johnson's Dairy	N	New Plant	
Ventres Dairy	N	New Plant	
Stanley Chemical Co.	N	New Plant	Aluminum Castings, Lacquers, and Enamels
Kensington Village			
Ferndale Dairy	N	New Plant	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Canton Town			
Collinsville Village	100	New Plant	
Hurley Mfg. Co.	12E	New Plant	Sanitary Sewage Only
Collins Co.	N	New Plant	Plating Wastes
Chester Town	589	New Plant	
Russell Jennings Mfg. Co.	N	Addition	Dust
Bishop & Watrus	N	New Plant	Sanitary Sewage Only
Chester Sanitary Laundry	N	New Plant	
E. W. Deuse Co.	4E	Enlargement of Existing Plant	Sanitary Sewage Only
M. S. Brooks & Sons	N	New Plant	Plating Wastes
C. J. Bates & Son	N	New Plant	Plating Wastes
Cromwell Town			
The J. & E. Stevens Co.	N	New Plant	Plating Wastes
Deep River Town	1,765	New Plant	
Electric Soldering Iron Company, Inc.	N	New Plant	Sanitary Sewage Only
Brass Goods Mfg. Co.	N	New Plant	Plating Wastes
Moore Mfg. Co.	3E	New Plant	Sanitary Sewage Only
Levett Metal Products Co.	N	New Plant	Plating Wastes
White Way Laundry	N	New Plant	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
East Haddum Town			
Walter A. McCabe Co.	5E	New Plant	Sanitary Sewage Only
Moodus Village			
Lloyd E. Cone Thread Co.	N	New Plant	Sanitary Sewage Only
Brownell & Co., Inc. (Upper Mill)	N	New Plant	Sanitary Sewage Only
Brownell & Co., Inc. (Lower Mill)	N	New Plant	Textile Wastes
Moodus Net & Twine, Inc.	N	New Plant	Sanitary Sewage Only
Machine Design Shop	N	New Plant	Sanitary Sewage Only
W. E. Nichols Garage	N	New Plant	
Neptune Twine & Cord Mills	N	New Plant	Sanitary Sewage Only
East Hampton Town			
Artistic Wire Products Company, Inc.	N	New Plant	Acid & Alkaline Wastes
Starr Brothers Bell Co.	N	New Plant	Sanitary Sewage Only
Johnson Electroplating Works	N	New Plant	Plating Wastes
N. N. Hill Brass Co.	N	New Plant	Plating Wastes
Bevin Wilcox Line Co.	N	New Plant	Sanitary Sewage Only
Bevin Brothers Mfg. Co.	N	New Plant	Plating Wastes
Gong Bell Mfg. Co.	N	New Plant	Plating Wastes
E. Hartford Town	19,000	New Plant	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
E. Hartford Town			
Silverland Pickle Co.	N	New Plant	
United Aircraft Corp.	N	New Plant	Plating Wastes
Case Brothers Inc.	N	New Plant	Paper Mill Wastes
Sanitary Paper Mills, Inc.	N	New Plant	Paper Mill Wastes
Burnside Co.	N	New Plant	Paper Mill Wastes
East Windsor Town			
Warehouse Point Village	1,000	New Plant	
Broad Brook Village			
Broad Brook Co.	N	New Plant	Textile Wastes
Enfield Town			
Thompsonville Village	9,500	Additions	
Scitico Village			
Gordon Brothers, Inc.	N	New Plant	Sanitary Sewage Only
Essex Town	1,010	New Plant	
Essex Boat Works, Inc.	5	New Plant	Sanitary Sewage Only
Essex Marine Railway, Inc.	3	New Plant	Sanitary Sewage Only
Verplex Co.	N	New Plant	Plating Wastes
Ivoryton Village			
Pratt, Read & Co., Inc.	N	Additions	Sanitary Sewage Only
Ernst Bischoff Co., Inc.	N	Addition	Pharmaceutical & Plastics Wastes

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Essex Town			
W. Whitney Stueck, Inc.	5E	New Plant	Sanitary Sewage Only
Behrens & Bushnell Co., Inc.	N	New Plant	Garage Wastes
Conn. Valley Mfg. Co.	18E	Addition	Sanitary Sewage Only
R. W. Cramer Co., Inc.	N	New Plant	Plating Wastes
Farmington Town	1,200	New Plant	
Unionville Village	100	New Plant	
Lapointe Plascomold Corp.	N	Addition	Sanitary Sewage Only
Pioneer Steel Ball Bearing Company	N	New Plant	Sanitary Sewage Only
Hartford Spinning Co., Inc.	N	New Plant	Textile Wastes
Mrytle Knitting Mills	N	New Plant	Washing Wastes
Charles W. House & Sons, Inc.	N	New Plant	Textile Wastes
Saling Mfg. Co.	N	Addition	Sanitary Sewage Only
New England Spring Mfg. Company, Inc.	N	Addition	Sanitary Sewage Only
Glastonbury Town	300	New Plant	
Crescent Tool & Design	7	New Plant	Sanitary Sewage Only
New England Play Pen Co.	2	New Plant	Sanitary Sewage Only
Airflo Instrument Co.	2	New Plant	Sanitary Sewage Only
Nutmeg Tool Co.	1	New Plant	Sanitary Sewage Only

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Glastonbury Town			
Firetox System Inc.	N	New Plant	Solvent & Detergent Cleaning Wastes
S. Glastonbury Village	100	Individual Treatment	Private Sewers
Matson Mills, Inc.	N	New Plant	Textile Wastes
Haddam Town			
Higganum Village			
Orkil, Inc.	N	Addition	Sanitary Sewage Only
Frismar, Inc.	N	New Plant	Solvent Wastes
Frissell Fabric Co.	N	New Plant	Dyeing Wastes
Hartford City			
Whitlock Mfg. Co.	N	New Plant	Pickling Wastes
Underwood Elliott Fisher Co.	N	New Plant	Plating Wastes
Holo-Droma Screw Corp.	N	New Plant	Oil Wastes
Manchester Town (South Plant)	19,220	Addition	
Manchester Town (North Plant)	10,550	Addition	
Case Brothers, Inc.	N	New Plant	Paper Mill Wastes
Old Colony Co.	N	Addition	Sanitary Sewage Only
Lydall & Foulds Paper Co.	N	New Plant	Paper Mill Wastes
Colonial Board Co.	N	New Plant	Paper Mill Wastes
Rogers Bros.	N	New Plant	Plastics Mfg.

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Middletown City	1,300	New Plant	Connection to Municipal System
Rock Fall Textile Printing Corp.	N	New Plant	Silk Printing and Washing
Russell Mfg. Co.	N	New Plant	Cotton Textile Wastes
New Britain City	73,660	Addition	
Landers, Frary & Clark (Main Plant)	N	New Plant	Plating Wastes
P. & F. Corbin	N	New Plant	Plating Wastes
Corbin Screw Division	N	New Plant	Plating Wastes
Fafnir Bearing Co.	N	New Plant	Plating Wastes
New Britain Machine Co.	N	New Plant	Plating Wastes
North & Judd Mfg. Co.	N	New Plant	Plating Wastes
Russell & Erwin Mfg. Co.	N	New Plant	Plating Wastes
Stanley Rule & Level Co.	N	New Plant	Plating Wastes
Landers, Frary & Clark (B. & K. Plant)	N	Connection to Municipal System	Plating Wastes
Landers, Frary & Clark (Range Division)	N	Connection to Municipal System	Pickling Wastes
Corbin Cabinet Lock Co.	N	Connection to Municipal System	Plating Wastes
New Britain Machine Co.	N	Connection to Municipal System	Grinding Wastes
Tuttle & Bailey, Inc.	N	Connection to Municipal System	Plating Wastes
New Hartford Town	200	New Plant	
Old Saybrook Town			
Saybrook Laundry, Inc.	N	New Plant	

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Old Saybrook Town			
John Magee Company	N	Addition	Bottle Cherries and Olives
Plainville Town			
H. C. Baum & Co.	N	New Plant	Plating Wastes
M. H. Sullivan Foundry	5	New Plant	Sanitary Sewage Only
Plainville Electroplating Company	N	New Plant	Plating Wastes
Bristol Spring Co.	3	New Plant	Sanitary Sewage Only
Plymouth Town			
Pequabuck Village	N	New Plant	
Portland Town	2,500	New Plant	
Rockville City	8,200	Replacement of Existing Plant	
Rocky Hill Town			
Drum Hill (PHA)	650	Connection to Metropolitan System	
Conn. Foundry Co.	50E	New Plant	Sanitary Sewage Only
Hartford Rayon Corp.	N	New Plant	Chemical Wastes
Simsbury Town			
Ensign-Bickford Co.	N	New Plant	Alkaline Wastes
Somers Town			
Somersville Village			
Somersville Mfg. Co.	N	New Plant	Textile Wastes
Suffield Town	N	Individual Treatment	Private Sewers

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Vernon Town			
Talcottville Village			
Aldon Spinning Mills	N	New Plant	Sanitary Sewage Only
Windsor Town	5,000	Connection to Metropolitan System	
Wilson Village	200	Connection to Metropolitan System	
Poquonock Village	250	New Plant	
Rainbow Village			
Stevens Paper Mills, Inc.	N	New Plant	Paper Mill Wastes
Windsor Locks Town	3,500	New Plant	
C.H. Dexter & Sons, Inc.	N	New Plant	Paper Mill Wastes
The Montgomery Co.	N	New Plant	Silver Plating
Windsor Locks Paper Co.	N	New Plant	Paper Mill Wastes
George P. Clark Co.	22	Connection to Municipal System	Sanitary Sewage Only
E. Horton & Son Co., Inc.	15	Connection to Municipal System	Sanitary Sewage Only
Gabb Mfg. Co.	5	Connection to Municipal System	Sanitary Sewage Only
Winsted City	6,000	New Plant	
Gilbert Clock Corp.	N	New Plant	Plating Wastes
Fairchilds Screw Products	6	New Plant	Sanitary Sewage Only

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Winsted City			
Winsted Mfg. Co.	8	New Plant	Sanitary Sewage Only
Winsted Hosiery Co.	N	New Plant	Textile Wastes
Capitol Products Co., Inc.	N	New Plant	Plating Wastes
Edward F. Hickey's Sons, Inc.	N	New Plant	Felt Wastes
Hudson Wire Co.	50	New Plant	Sanitary Sewage Only
Dano Electric Co.	47	New Plant	Sanitary Sewage Only
Maderite Paper Box Co.	5	New Plant	Sanitary Sewage Only
H. Baker of Connecticut	8	New Plant	Sanitary Sewage Only
Winsted Co.	N	New Plant	Plating Wastes
Keratene Co. (2 plants)	N	New Plant	Brine Wastes
Mason Silk Co.	N	New Plant	Textile Wastes
New England Knitting Co.	N	New Plant	Textile Wastes
Sterling Name Tape Co.	N	New Plant	Sanitary Sewage Only
Winsted Hardware Mfg. Co.	N	New Plant	Plating Wastes
Union Pin Co.	N	New Plant	Plating Wastes
Jewell Products, Inc.	8	New Plant	Sanitary Sewage Only

TABLE 22 (Continued)

Name or Type of Industry and Location	Population* Served	Improvements Needed	Remarks
Winsted City			
Son Chief Electric Company, Inc.	N	New Plant	Plating Wastes
Winsted Edge Tool Co.	15	New Plant	Sanitary Sewage Only
Deep River Mfg. Co.	None	New Plant	Plating Wastes

* N - Undetermined; E - Estimated

Table 22 shows a large number of projects required in the present pollution abatement programs of the State water pollution control agencies. When the needs for 112 other sources of sewage and industrial wastes from municipalities and manufacturing plants have been determined, the number of projects required in the comprehensive program will be considerable higher.

Much good work towards the formulation and completion of a comprehensive plan for the control and abatement of stream pollution has been accomplished and there is much that remains to be done. Now all of the States in the basin have become members of the New England Interstate Water Pollution Control Commission, and this organization will be able to contribute substantially to an over-all single plan of pollution control.

The success of a planned program of water pollution prevention and abatement in the Connecticut River Basin will depend in large measure on understanding of the problems involved, willingness to proceed to a satisfactory solution and wholehearted cooperation by the citizens, industries and regulatory agencies. This will require a well-rounded program of education of the public and industry in the needs for and the benefits to be derived from pollution abatement.

Under Part 12, "Benefits Resulting from Pollution Prevention and Abatement," ten benefits possible from pollution prevention and abatement in the Connecticut River Basin were cited. All of these benefits are possible if public support is given to a comprehensive program and a greater utilization of the available water resources is developed. There is reason to believe that if the public and industry were informed through a sound program of education in the needs for and benefits from stream pollution prevention and abatement that support of a comprehensive program to attain that goal through good community planning would be forthcoming. A program of public education would weld together and reconcile the interests of private citizens, sportsmen's groups, social clubs, recreation interests, industrial groups and all State or other agencies concerned with the conservation and utilization of the water resources of the basin.

In addition to the many worthwhile benefits that can be accredited to water pollution control there is an undeniable moral obligation on the part of municipalities and industries to adequately treat their wastes before discharge into public waterways.

Those who must contribute to and cooperate in a successful comprehensive program of pollution prevention and abatement in the Connecticut River Basin are, in the last analysis, the beneficiaries and the number and extent of benefits derived therefrom will be measured by the total effort expended.

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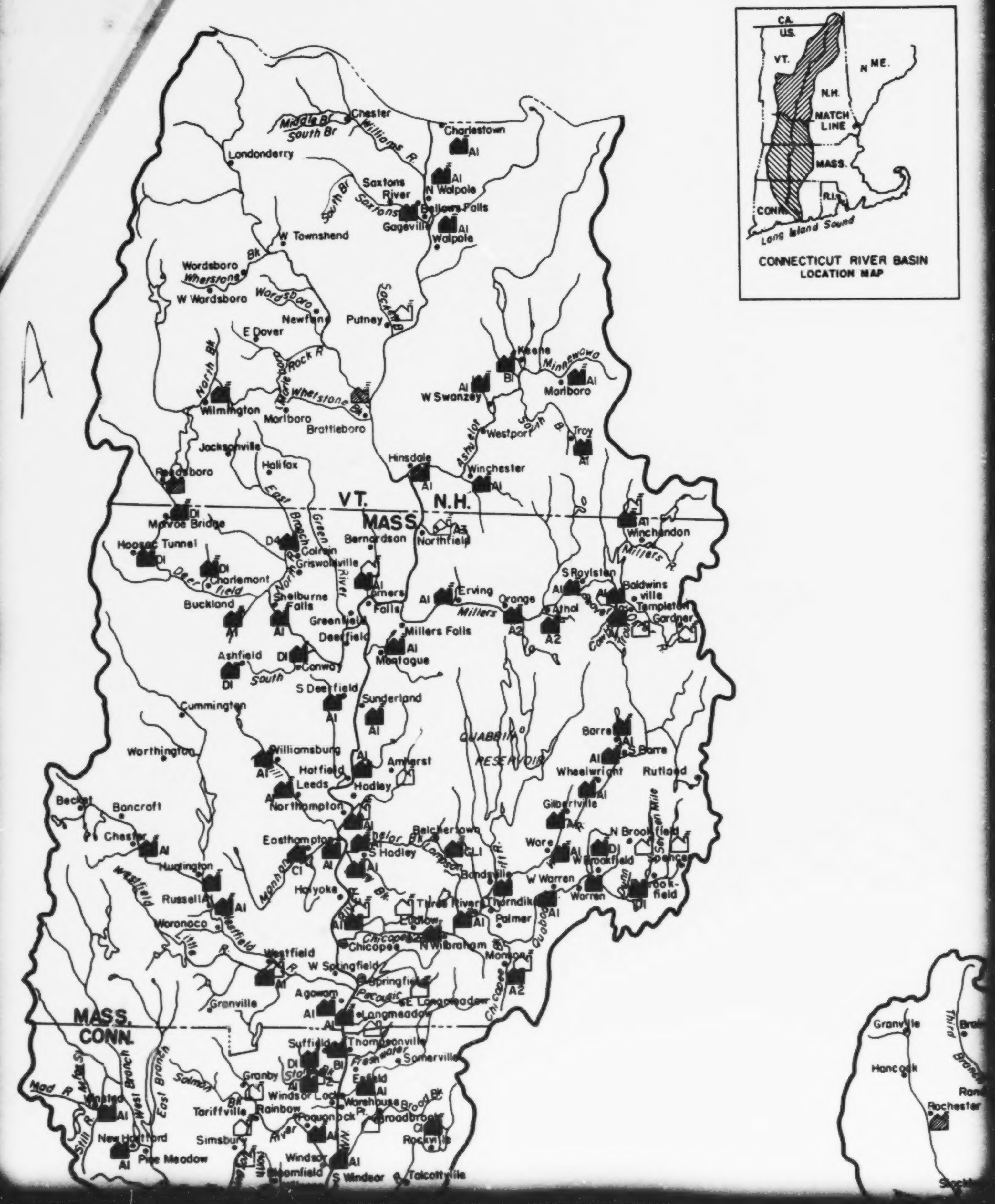
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Charlestown
Londonderry
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N Walpole
Bellows Falls
Gageville
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W Townshend
Wordsboro
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Wardsboro
Newfane
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Sacketts Bk
E Dover
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Wilmington
Marlboro
Wherstone Bk
Brattleboro
Keene
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Westport
Troy
Jacksonville
Halifax
Hinsdale
Winchester
Readsboro
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Hoosac Tunnel
Bernardson
Northfield
Colrain
Griswoldville
Charlemont
Deerfield
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Green River
Buckland
Shelburne Falls
Turners Falls
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Williamsburg
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Brookfield
Russell
Holyoke
Three Rivers
Thorndike
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Warehouse Pt.
Broad Bk
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Salmon
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Tariffville
Rainbow
Poquonock
Broadbrook
Rockville
New Hartford
Simsbury
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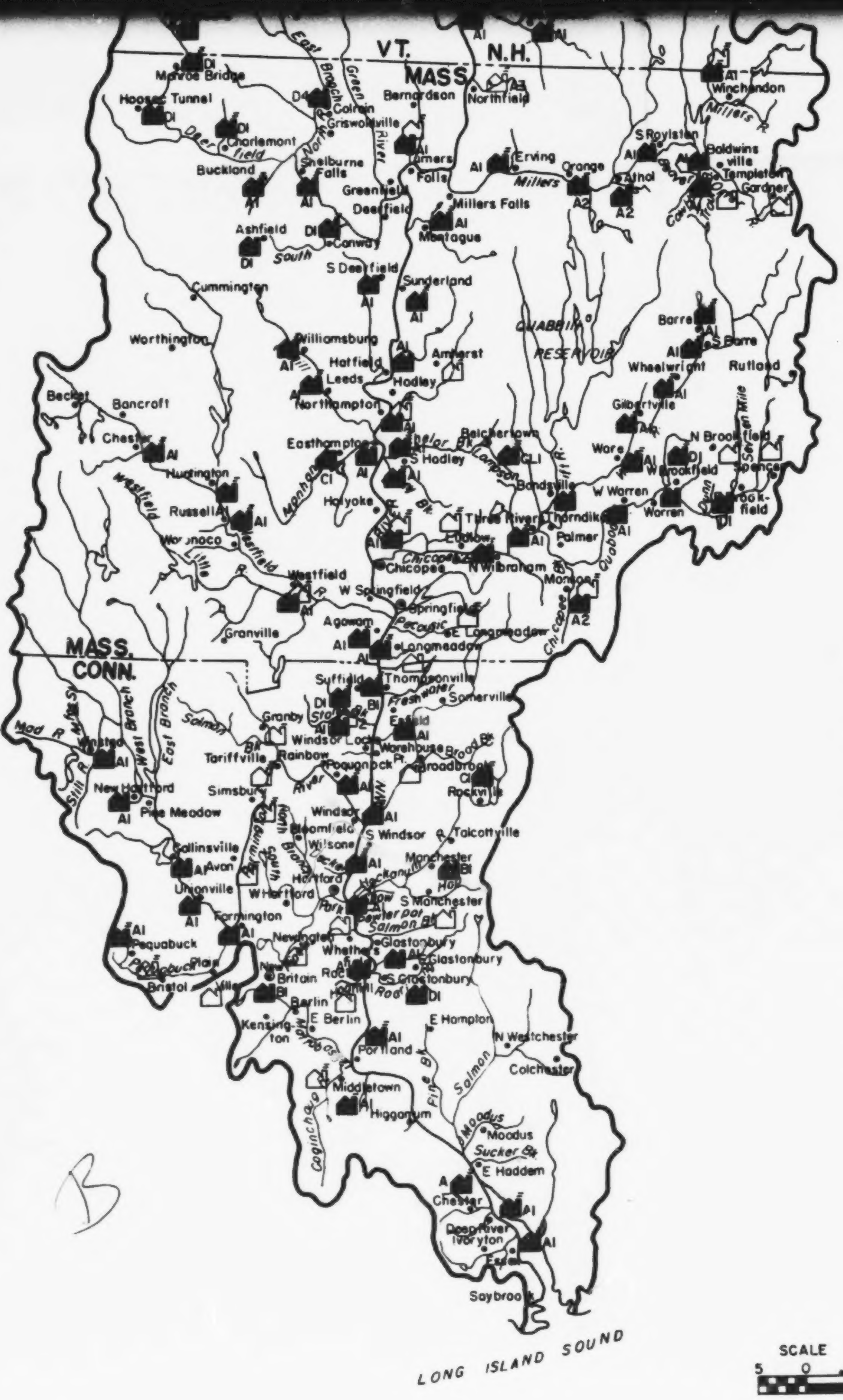
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Mad R.
Winsted
West Branch
East Branch
Windsor Locks
Warehouse Pt.
Broad Bk.
Broadbrook
Tariffville
Rainbow
Poquonock
Rockville
New Hartford
Simsbury
Pine Meadow
Still R.
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Bloomfield
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Talcottville
Wilsons
Collinsville
Avon
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Bristol
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Kensington
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Portland
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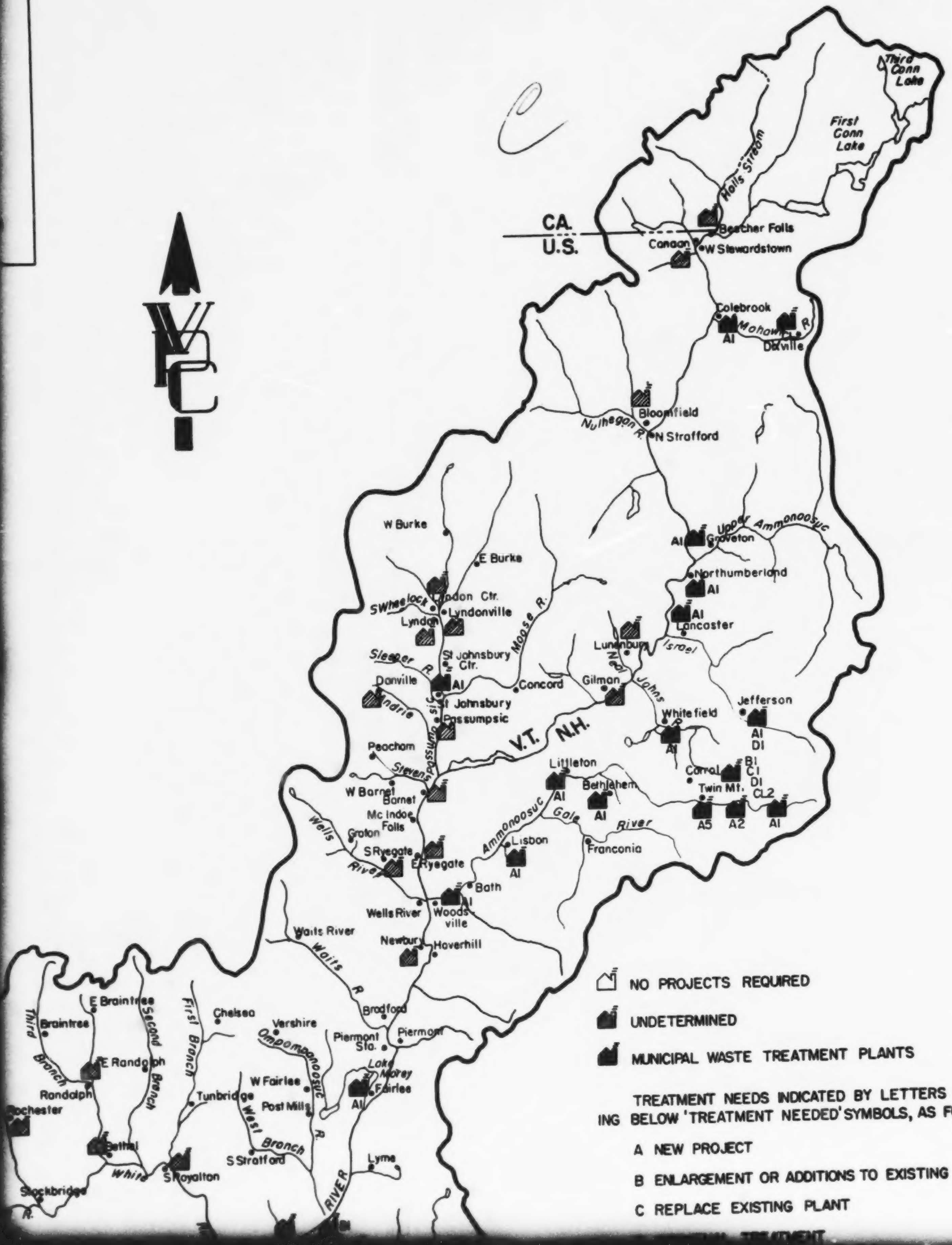

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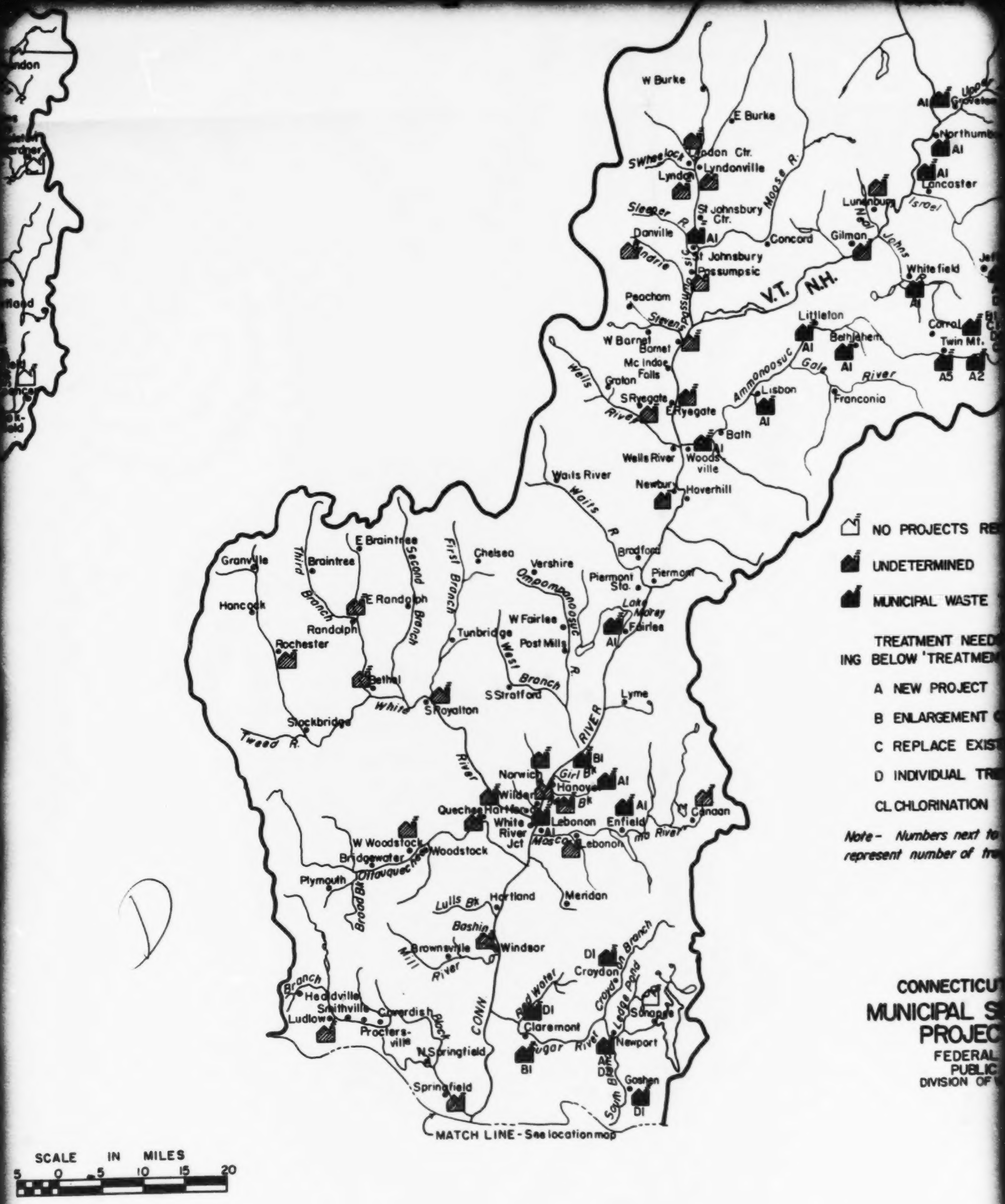
TREATMENT NEEDS INDICATED BY LETTERS APPEARING BELOW 'TREATMENT NEEDED' SYMBOLS, AS FOLLOWS:
A NEW PROJECT
B ENLARGEMENT OR ADDITIONS TO EXISTING PLANT
C REPLACE EXISTING PLANT
TREATMENT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Rochester
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White River Jct
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Canaan
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Bridgewater
Ottauquechee
Plymouth
Broad Bk
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Hartland
Meriden
Bashin
Brownsville
Windsor
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Sunapee
Branch
Healdville
Smithville
Ludlow
Cavendish
Proctorsville
Black
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Gilman
Whitefield
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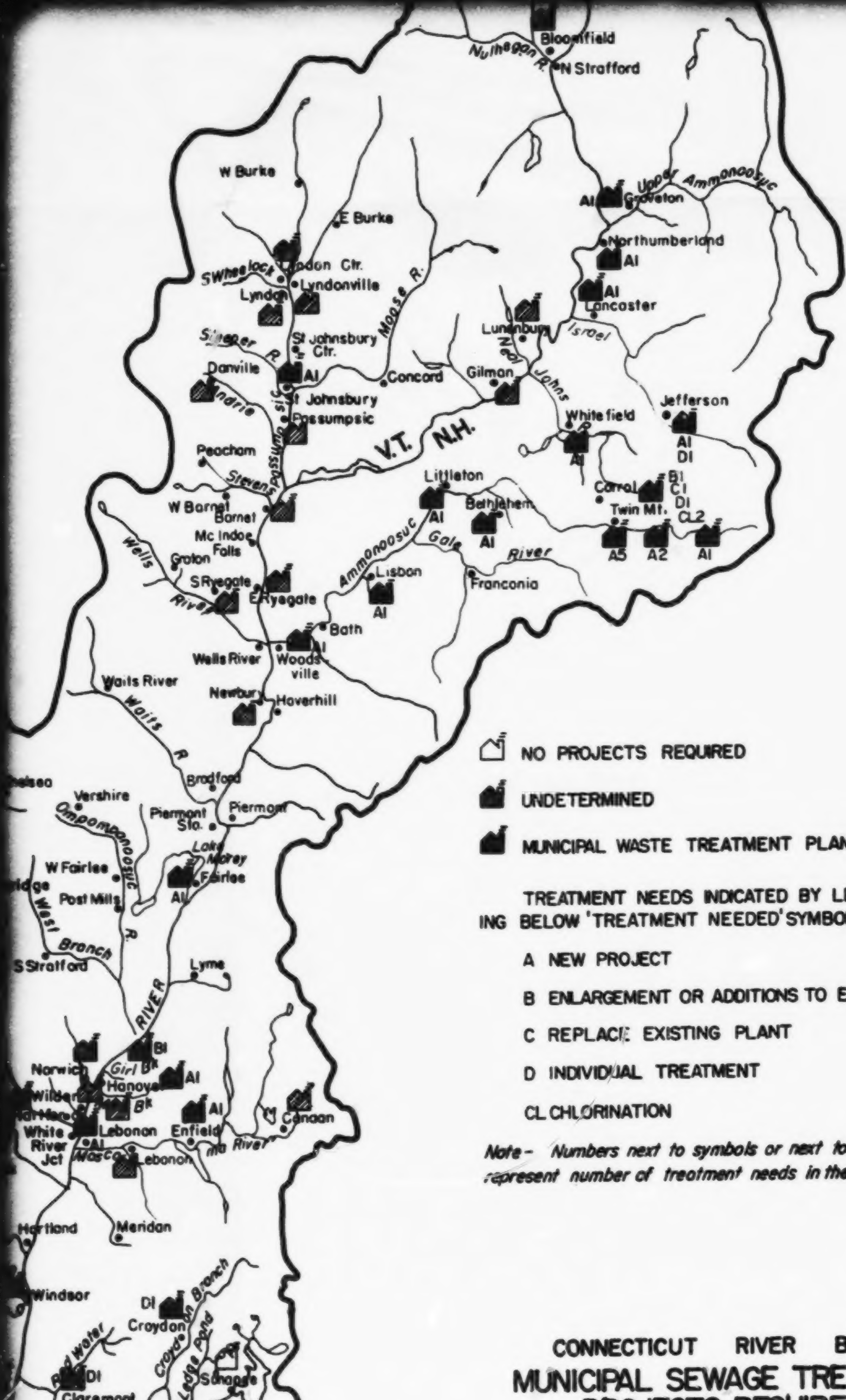
DIVISION OF


Bloomfield
Nulhegan R.
N Strafford
Upper Ammonoosuc
W Burke
E Burke
AI
Groveton
Northumberland
AI
AI
Lancaster
Lyndon Ctr.
S Wheelock
Lyndonville
Lyndon
Moose R.
Sleeper R.
St Johnsbury Ctr.
AI
Lunenburg
Israel
Neal
Johns
Danville
Joe's
Concord
Gilman
St Johnsbury
Passumpsic
Jefferson
AI
DI
Whitefield
AI
V.T.
N.H.
Peacham
Stevens
Passumpsic
Littleton
AI
Carroll
BI
CI
DI
CL2
Twin Mt.
A5
A2
AI
Bethlehem
AI
W Barnet
Barnet
Mc Indoe Falls
Ammonoosuc
Gale River
Wells
Groton
S Ryegate
E Ryegate
Wells River
Lisbon
AI
Franconia
Bath
AI
Wells River
Woodsville
Waits River
Waits R.
Newbury
Haverhill
Bradford
Chelsea
Vershire
Ompompanoosuc R.
Piermont Sta.
Piermont
Lake Morey
W Fairlee
Fairlee
AI
Post Mills
West Branch
S Stratford
Lyme
RIVER
BI
Norwich
Girl Bk
Hanover
AI
Wilder
Hartford
Mink Bk
AI
Canaan
White River Jct
Lebanon
AI
Enfield
Mascoma River
Lebanon
Hartland
Meridan
Windsor
DI
Croydon
Croydon Branch
Cold Water
DI
Sunapee
Claremont
Ledge Pond
Sugar River
Newport
BI
AE
DE
Goshen
South Branch
DI
LINE - See location map

☐ NO PROJECTS REQUIRED

▨ UNDETERMINED

■ MUNICIPAL WASTE TREATMENT PLANTS

TREATMENT NEEDS INDICATED BY LETTERS APPEARING BELOW 'TREATMENT NEEDED' SYMBOLS, AS FOLLOWS:

A NEW PROJECT

B ENLARGEMENT OR ADDITIONS TO EXISTING PLANT

C REPLACE EXISTING PLANT

D INDIVIDUAL TREATMENT

CL CHLORINATION

Note - Numbers next to symbols or next to code letters represent number of treatment needs in the category designated.

E

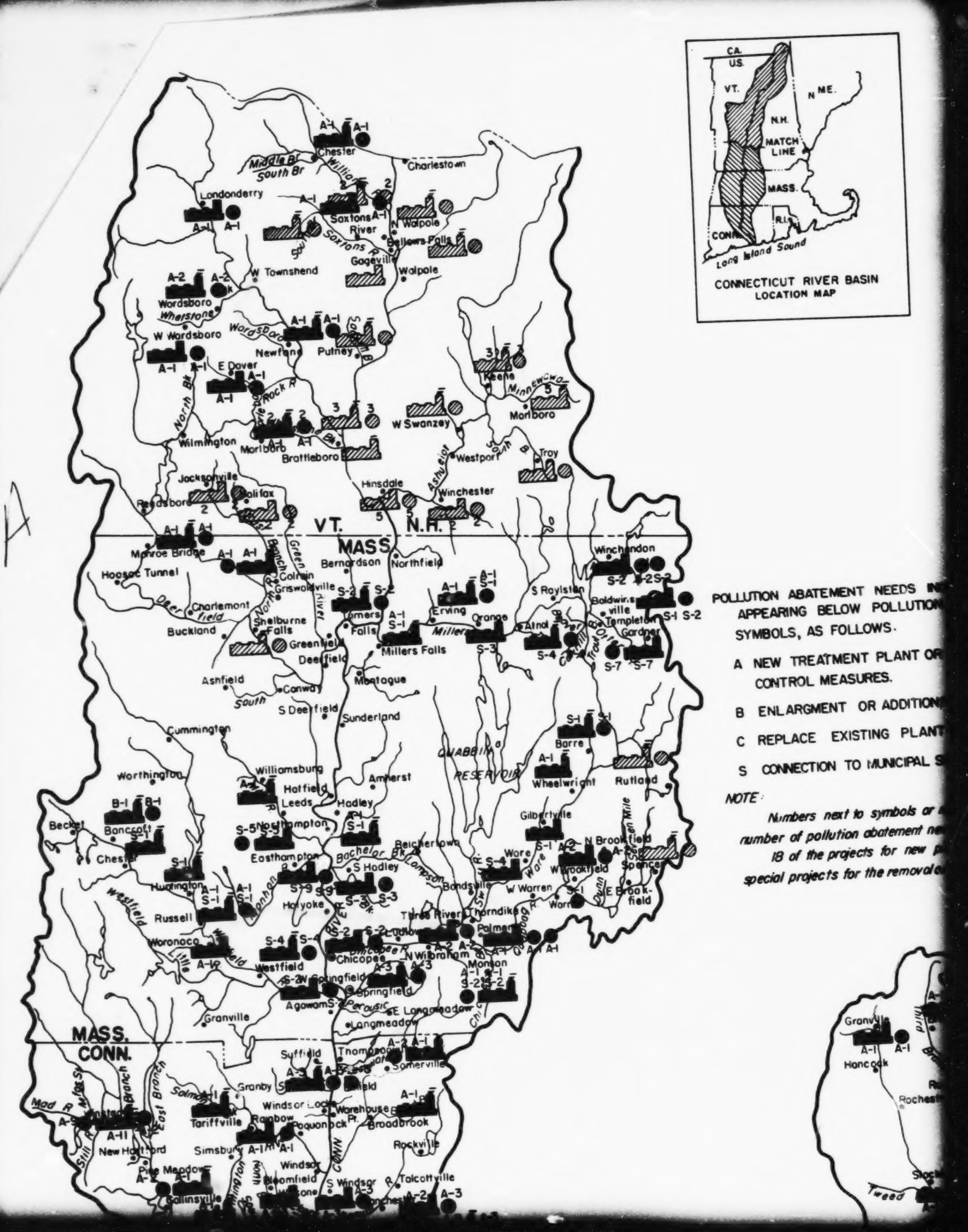
CONNECTICUT RIVER BASIN

MUNICIPAL SEWAGE TREATMENT PROJECTS REQUIRED

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL

MAP No.7

A


CONNECTICUT RIVER BASIN LOCATION MAP
CA.
US.
VT.
N.H.
ME.
MATCH LINE
MASS.
R.I.
CONN.
Long Island Sound
VT.
N.H.
MASS
MASS.
CONN.
Chester
Charlestown
Middle Br
South Br
Williams
Londonderry
Saxtons River
N Walpole
Bellows Falls
Saxtons R
Gageville
Walpole
W Townshend
Wardsboro
Wherstone
W Wardsboro
Newfane
Putney
E Dover
Rock R
North Br
Wilmington
Marlboro
Brattleboro
W Swanzey
Keene
Minnewawa
Marlboro
Westport
Troy
Ashuelot
South B
Jacksonville
Readsboro
Halifax
Hinsdale
Winchester
Monroe Bridge
Hoosac Tunnel
Bernardson
Northfield
Colrain
Griswoldville
Charlemont
Deerfield
Buckland
Shelburne Falls
Greenfield
Deerfield
Green River
North R
Turners Falls
Millers Falls
Erving
Orange
Millers
Athol
S Royalston
Winchendon
Baldwinsville
Templeton
Gardner
Ashfield
Conway
South
S Deerfield
Montague
Sunderland
Cummington
Quabbin Reservoir
Barre
Wheelwright
Rutland
Worthington
Williamsburg
Hatfield
Leeds
Amherst
Hadley
Northampton
Becket
Bancroft
Chester
Gilbertville
Belchertown
Ware
N Brookfield
W Brookfield
Spencer
Seven Mile
Easthampton
S Hadley
Bachelor Bk
Lampson
Huntington
Holyoke
Bondsville
W Warren
Warren
E Brookfield
Westfield
Russell
Three Rivers
Thorndike
Palmer
Ludlow
Chicopee R
Woronoco
Little
Westfield
Chicopee
N Wilbraham
Monson
W Springfield
Springfield
Agawam
Granville
E Longmeadow
Longmeadow
Suffield
Thompsonville
Somerville
Granby
Enfield
Salmon
Mad R
Winsted
East Branch
Tariffville
Windsor Locks
Rainbow
Warehouse Pt.
Broadbrook
Poquonock
Simsbury
Rockville
New Hartford
Still R
Windsor
Pine Meadow
Collinsville
Bloomfield
Wilson
S Windsor
Talcottville
Manchester
CONN
Granville
Hancock
Rochester
Third
Stockbridge
Tweed
A-1
A-2
A-3
A-11
B-1
S-1
S-2
S-3
S-4
S-5
S-7
S-9
2
3
5

POLLUTION ABATEMENT NEEDS IN
APPEARING BELOW POLLUTION
SYMBOLS, AS FOLLOWS.

A NEW TREATMENT PLANT OR
CONTROL MEASURES.

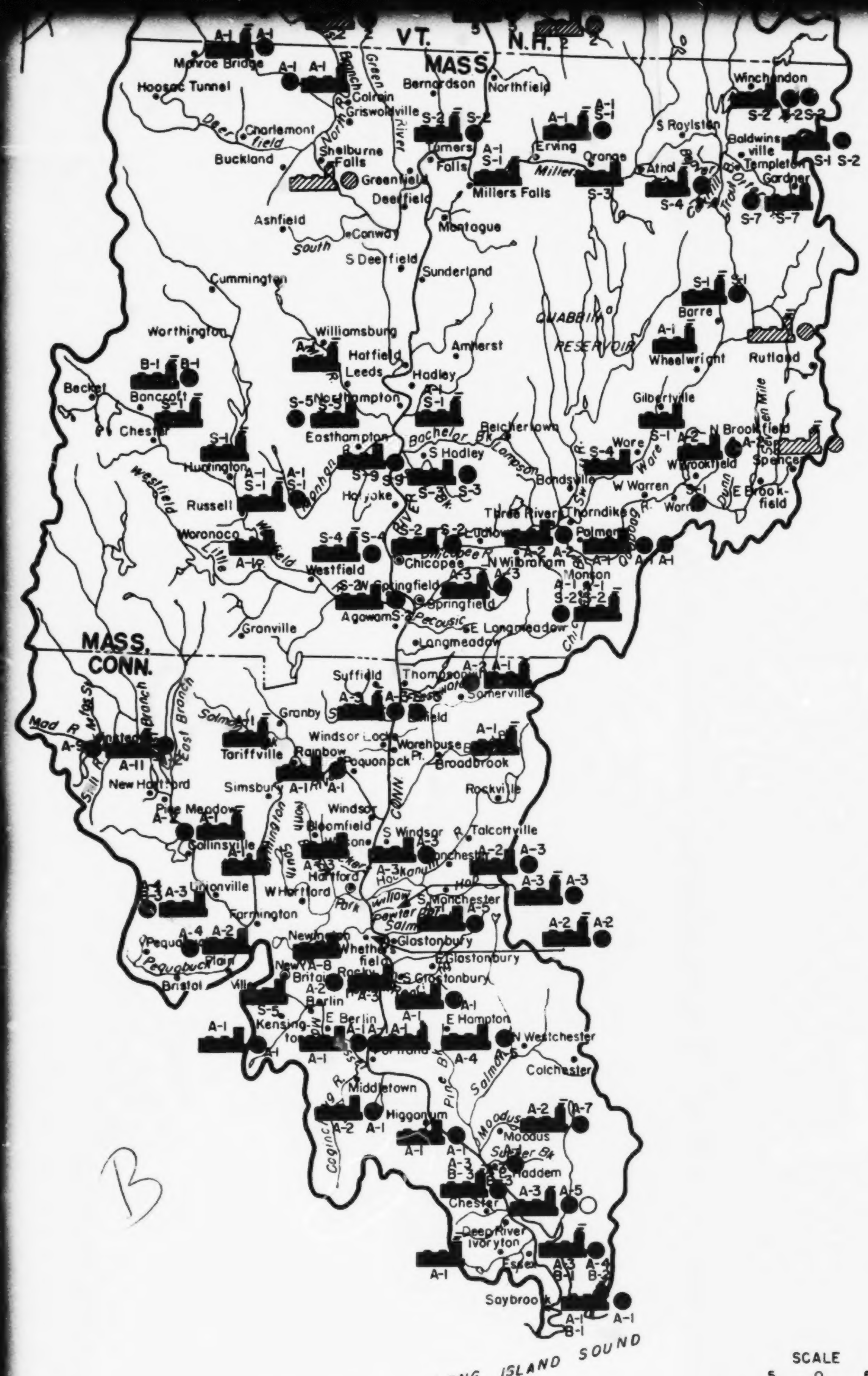
B ENLARGMENT OR ADDITION

C REPLACE EXISTING PLANT

S CONNECTION TO MUNICIPAL S

NOTE:

Numbers next to symbols or
number of pollution abatement ne
18 of the projects for new p
special projects for the removal o


VT.
N.H.
MASS.
CONN.
Monroe Bridge
Hoosac Tunnel
Colrain
Griswoldville
Bernardson
Northfield
Winchendon
Charlemont
Buckland
Shelburne Falls
Greenfield
Deerfield
Turners Falls
Erving
Orange
Millers Falls
S Royalston
Athol
Baldwinsville
Templeton
Gardner
Ashfield
Conway
Montague
S Deerfield
Sunderland
Cummington
Barre
Worthington
Williamsburg
Hatfield
Leeds
Amherst
Hadley
QUABBIN RESERVOIR
Wheelwright
Rutland
Becket
Boncroft
Chester
Northampton
Easthampton
Gilbertville
Belchertown
S Hadley
Ware
N Brookfield
W Brookfield
Spencer
Huntington
Russell
Holyoke
Bondsville
W Warren
Warren
E Brookfield
Three Rivers
Thorndike
Palmer
Woronoco
Westfield
Chicopee
Ludlow
N Wilbraham
Monson
Springfield
W Springfield
Agawam
E Longmeadow
Longmeadow
Granville
Suffield
Thompsonville
Somerville
Enfield
Granby
Tariffville
Winsted
New Hartford
Windsor Locks
Rainbow
Poquonock
Warehouse Pt.
Broadbrook
Simsbury
Rockville
Pine Meadow
Collinsville
Windsor
Bloomfield
S Windsor
Talcottville
Manchester
Unionville
W Hartford
Hartford
Farmington
S Manchester
Newington
Wethersfield
Glastonbury
Bristol
Plainville
New Britain
Berlin
Rocky Hill
S Glastonbury
Kensington
E Berlin
Portland
E Hampton
N Westchester
Colchester
Middletown
Higganum
Moodus
Haddam
Chester
Deep River
Ivoryton
Essex
Saybrook
LONG ISLAND SOUND

SCALE IN MILES

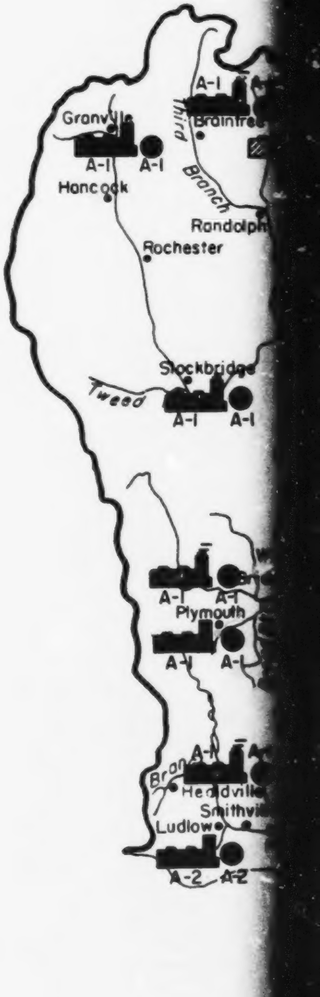
5 0 5 10 15 20

POLLUTION ABATEMENT NEEDS INDIC
APPEARING BELOW POLLUTION A
SYMBOLS, AS FOLLOWS.

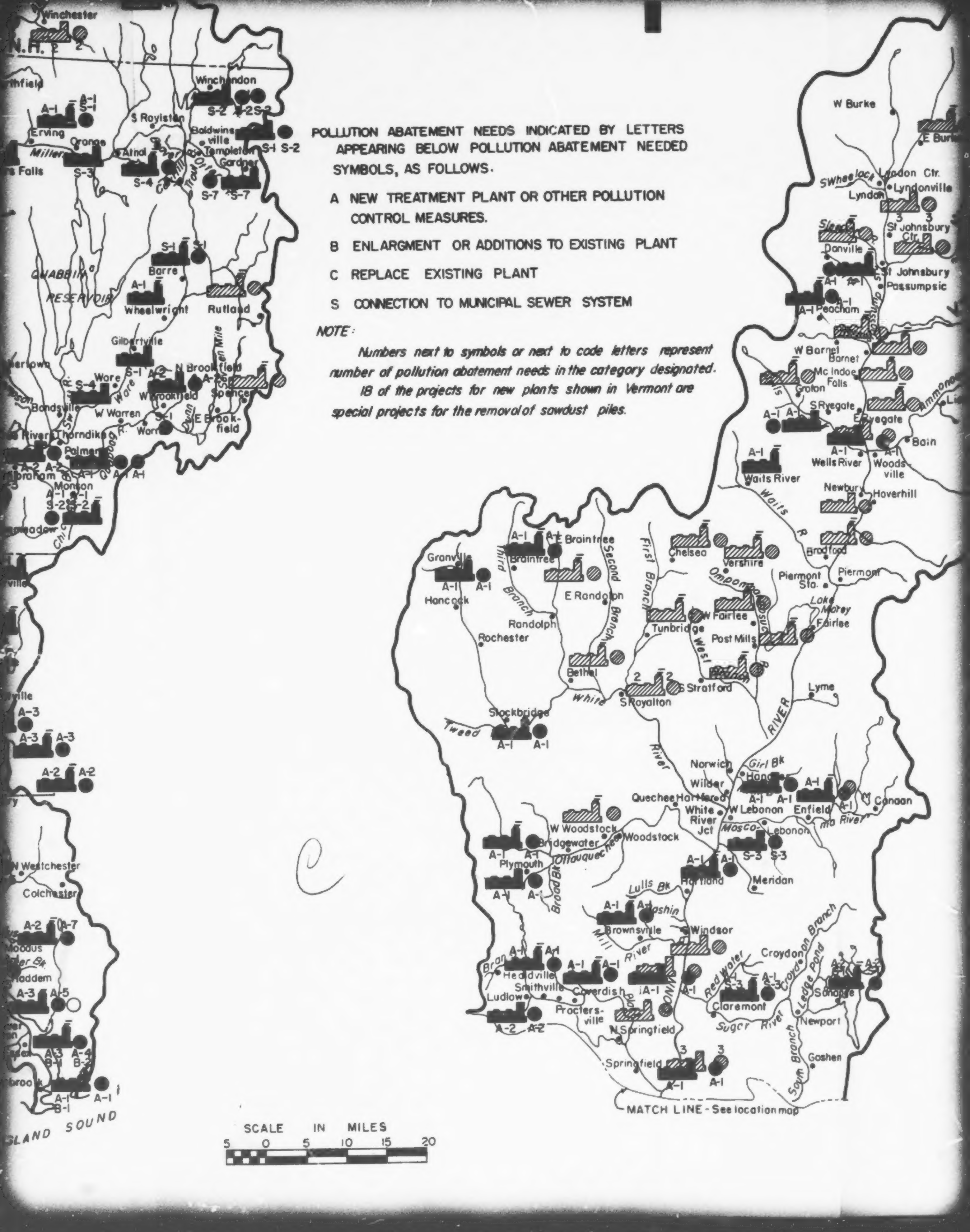
- A NEW TREATMENT PLANT OR O
  CONTROL MEASURES.
- B ENLARGMENT OR ADDITIONS T
- C REPLACE EXISTING PLANT
- S CONNECTION TO MUNICIPAL SEW

NOTE:

Numbers next to symbols or next
number of pollution abatement needs
18 of the projects for new plants
special projects for the removal of s


Granville
Hancock
Braintree
Third Branch
Randolph
Rochester
Stockbridge
Tweed
Plymouth
Healdville
Smithville
Ludlow

B



POLLUTION ABATEMENT NEEDS INDICATED BY LETTERS APPEARING BELOW POLLUTION ABATEMENT NEEDED SYMBOLS, AS FOLLOWS.

A NEW TREATMENT PLANT OR OTHER POLLUTION CONTROL MEASURES.

B ENLARGMENT OR ADDITIONS TO EXISTING PLANT

C REPLACE EXISTING PLANT

S CONNECTION TO MUNICIPAL SEWER SYSTEM

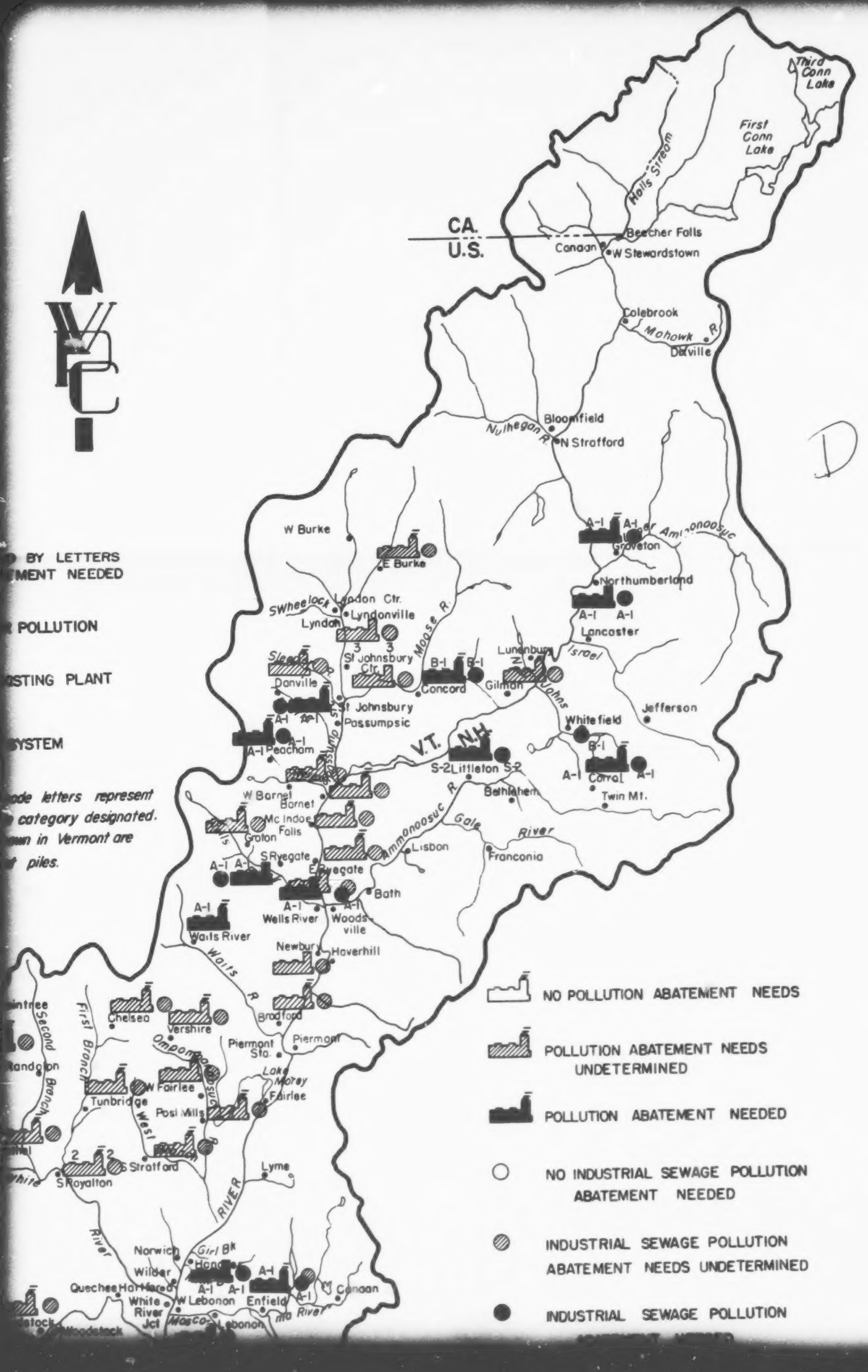
NOTE:

Numbers next to symbols or next to code letters represent number of pollution abatement needs in the category designated.

18 of the projects for new plants shown in Vermont are special projects for the removal of sawdust piles.

Winchester
N.H.
Winchendon
S Royalston
Baldwinsville
Templeton
Gardner
Erving
Orange
Athol
Millers
Quabbin Reservoir
Barre
Wheelwright
Rutland
Gilbertville
Ware
N Brookfield
W Brookfield
Spencer
E Brookfield
W Warren
Bondsville
Thorndike
Palmer
Monson
N Westchester
Colchester
Moodus
Haddam
Island Sound
W Burke
E Burke
Lyndon
Lyndon Ctr.
Lyndonville
St Johnsbury Ctr.
Danville
St Johnsbury
Passumpsic
Peacham
W Barnet
Barnet
Mc Indoe Falls
Groton
S Ryegate
E Ryegate
Wells River
Woodsville
Bain
Waits River
Newbury
Haverhill
Bradford
Piermont
Piermont Sta.
Chelsea
Vershire
Ompompanoosuc
Lake Morey
Fairlee
W Fairlee
Post Mills
Tunbridge
Braintree
E Braintree
Granville
Hancock
E Randolph
Randolph
Rochester
Bethel
S Royalton
S Stratford
Lyme
Stockbridge
Tweed
White
River
Norwich
Wilder
Hanover
Quechee
Hartford
White River Jct
W Lebanon
Lebanon
Enfield
Canaan
Mascoma River
W Woodstock
Woodstock
Bridgewater
Plymouth
Ottauquechee
Broad Bk
Hartland
Meriden
Lulls Bk
Brownsville
Windsor
Croydon
Headville
Smithville
Cavendish
Ludlow
Proctersville
N Springfield
Springfield
Claremont
Sugar River
Newport
Sunapee
Goshen
South Branch
Ledge Pond
Red Water
MATCH LINE - See location map
SCALE IN MILES
5 0 5 10 15 20

C



WPCL
D BY LETTERS
EMENT NEEDED
R POLLUTION
XISTING PLANT
SYSTEM
ade letters represent
e category designated.
own in Vermont are
t piles.
Third Conn Lake
First Conn Lake
Halls Stream
CA.
U.S.
Beecher Falls
Canaan
W Stewardstown
Colebrook
Mohawk R
Dixville
Bloomfield
Nulhegan R
N Stratford
Upper Ammonoosuc
A-1
Groveton
Northumberland
Lancaster
Israel
W Burke
E Burke
S Wheelock
Lyndon Ctr.
Lyndonville
Lyndon
Moose R.
Sleeper
St Johnsbury Ctr.
3
Danville
Concord
B-1
Lunenburg
Gilman
Johns
St Johnsbury
Passumpsic
Peacham
V.T.
N.H.
Whitefield
Jefferson
Littleton
S-2
Carroll
Twin Mt.
Bethlehem
W Barnet
Barnet
Mc Indoe Falls
Groton
S Ryegate
E Ryegate
Ammonoosuc R
Gale River
Lisbon
Franconia
Bath
Wells River
Woodsville
Waits River
Waits R
Newbury
Haverhill
Bradford
Braintree
Chelsea
Vershire
Second Branch
First Branch
Ompompanoosuc R
Randolph
Piermont Sta.
Piermont
Lake Morey
W Fairlee
Fairlee
Tunbridge
Post Mills
West
Bethel
2
S Stratford
S Royalton
Lyme
RIVER
White River
Norwich
Girl Bk
Wilder
Hanover
Quechee
Hartford
White River Jct
W Lebanon
Enfield
Mascoma River
Canaan
Lebanon
Woodstock
W Woodstock
NO POLLUTION ABATEMENT NEEDS
POLLUTION ABATEMENT NEEDS UNDETERMINED
POLLUTION ABATEMENT NEEDED
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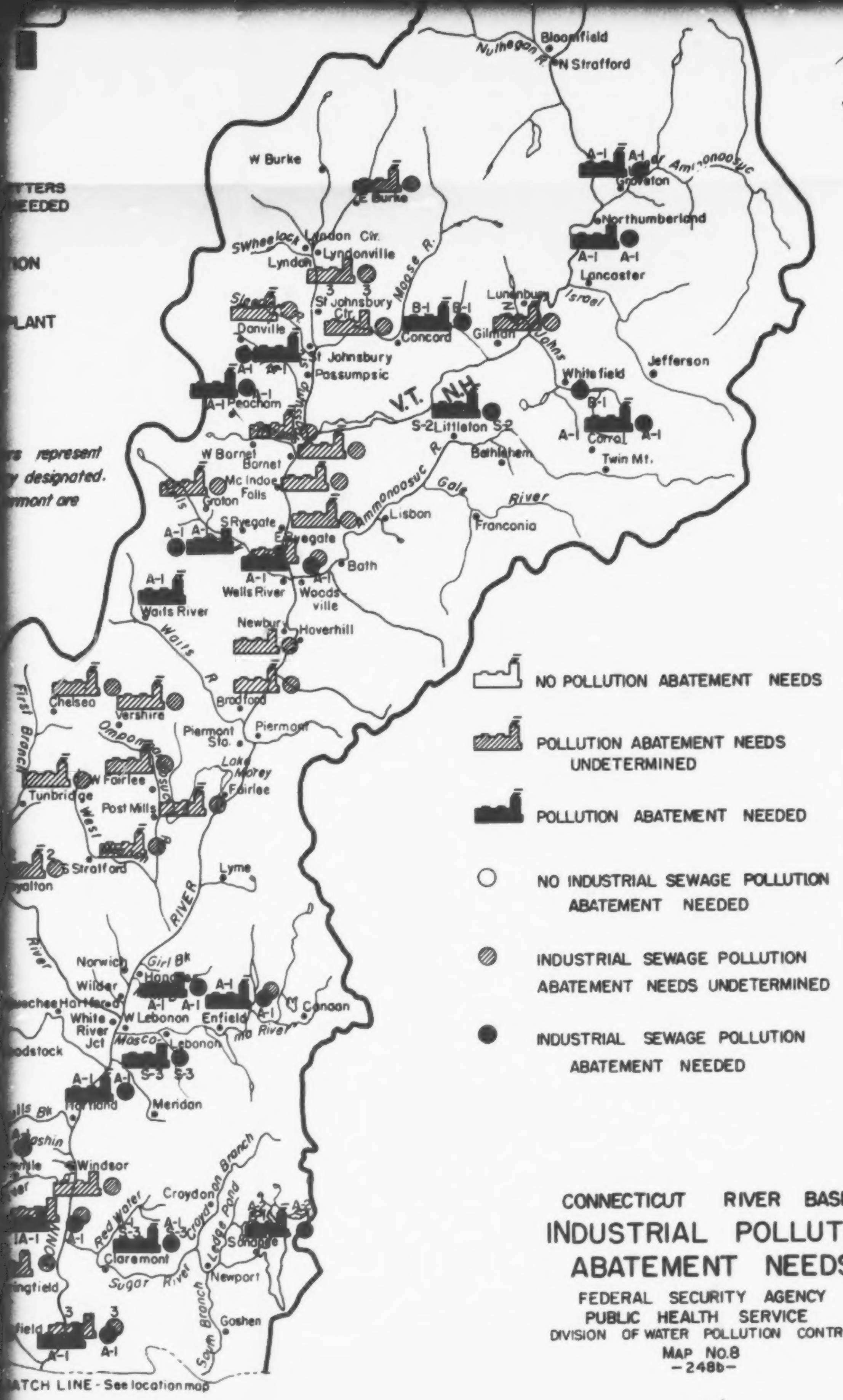
INDUSTRIAL SEWAGE POLLUTION ABATEMENT NEEDED

D

D


Bloomfield
Nulhegan R.
N Stratford
W Burke
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Northumberland
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A-I
Lancaster
S Wheelock
Lyndon Ctr.
Lyndonville
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St Johnsbury Ctr.
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B-I
Concord
Lunenburg
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Israel
Johns
St Johnsbury
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Whitefield
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Littleton
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Carroll
A-I
Twin Mt.
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Bethlehem
Mc Indoe Falls
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Ammonoosuc R.
Gale River
Lisbon
Franconia
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E Ryegate
Bath
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A-I
Wells River
Woodsville
Waits River
Newbury
Haverhill
Waits R.
Bradford
Chelsea
Vershire
Piermont Sta.
Piermont
First Branch
Ompompanoosuc
Lake Morey
Tunbridge
W Fairlee
Fairlee
Post Mills
West
2
S Strafford
Royalton
Lyme
RIVER
White River
Norwich
Girl Bk
Wilder
Hanover
A-I
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A-I
Enfield
A-I
Canaan
Quechee
Hartford
White River Jct
W Lebanon
Mascoma River
Lebanon
Woodstock
A-I
A-I
S-3
S-3
Hartland
Meridan
Mills Bk
Ascutney
Ottauquechee
Windsor
Croydon
Croydon Branch
Red Water
S-3
A-I
S-3
A-I
A-I
A-2
A-2
Sunapee
Ledge Pond
Claremont
Sugar River
Newport
Springfield
South Branch
Goshen
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3
A-I
A-I
MATCH LINE - See location map
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NO POLLUTION ABATEMENT NEEDS
POLLUTION ABATEMENT NEEDS UNDETERMINED
POLLUTION ABATEMENT NEEDED
NO INDUSTRIAL SEWAGE POLLUTION ABATEMENT NEEDED
INDUSTRIAL SEWAGE POLLUTION ABATEMENT NEEDS UNDETERMINED
INDUSTRIAL SEWAGE POLLUTION ABATEMENT NEEDED

E

CONNECTICUT RIVER BASIN

INDUSTRIAL POLLUTION
ABATEMENT NEEDS

FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL
MAP NO.8

APPENDIX TO

REPORT ON WATER POLLUTION

CONNECTICUT RIVER BASIN

1951

APPENDIX "A" - Basic Data on Municipal Sources of Pollution

APPENDIX "B" - Basic Data on Industrial Sources of Pollution

APPENDIX "C" - Summary of State Water Pollution Control Laws and Interstate Legislation in Effect

APPENDIX "D" - Digest of Proposed Connecticut River Flood Control Commission Compact

APPENDIX A

BASIC DATA ON SOURCES OF MUNICIPAL* POLLUTION

CONNECTICUT RIVER BASIN

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Connecticut R.									
(main stem)									
Beecher Falls (Canaan T), Vt.	370	50	50E	(No Municipal System)			50E	Undet'd.	Inactive
Canaan (T), Vt.	368	85	85E	(No Municipal System)			85E	Undet'd.	Inactive
Northumberland (T), N. H.	325	100	100E	(No Municipal System)			100E	New Plant	Inactive
Gilman, Vt. (Lunenberg T)	303	200	200E	(No Municipal System)			200E	Undet'd.	Inactive
Barnet (T), Vt.	281	55	55E	(No Municipal System)			55E	Undet'd.	Inactive
E. Ryegate, Vt. (Ryegate T)	273	75	75E	(No Municipal System)			75E	Undet'd.	Inactive
Newbury (T), Vt.	259	420	420E	None	--	--	420E	Undet'd.	Inactive
Norwich (T), Vt.	219	65	65E	None	--	--	65E	Undet'd.	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Connecticut R. (main stem)									
Wilder, Vt. (Hartford T)	217	600	600E	None	--	--	600E	Undet'd.	Inactive
White River Jct. (Hartford T)	215	2,000	N	None	--	--	N	Undet'd.	Inactive
W. Lebanon, N.H. (Lebanon T)	215	1,000	1,000E	(No Municipal System)			1,000E	New Plant	Inactive
Windsor (T), Vt.	201	3,000	4,700E	None	--	--	4,700E	Undet'd.	Inactive
Charlestown (T), N.H.	183	700	700E	None	--	--	700E	New Plant	Inactive
N. Walpole, N.H. (Walpole T)	175	200	200E	(No Municipal System)			200E	New Plant	Inactive
Bellows Falls (V), Vt.	175	4,000	19,000E	None	--	--	19,000E	Undet'd.	Inactive
Walpole (T), N.H.	170	900	900E	None	--	--	900E	New Plant	Inactive
Putney (T) Putney School	161	175	175E	Secondary	Satis.	Satis.	None 1/	None	Inactive
Brattleboro (T), Vt.	151	8,200	8,275E	None	--	--	8,275E	Undet'd.	Inactive

1/ Effluent from treatment plant discharged to ground water.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Connecticut R. (main stem)									
Northfield (T), Mass.	136	50	50E	(No Municipal System)			50E	New Plant	Inactive
Mt. Hermon School Mass. (Northfield T)	136	500	500E	None	--	--	500E	New Plant	Inactive
Northfield Seminary, Mass. (Northfield T)	136	500	500E	None	--	--	500E	New Plant	Inactive
Montague (T), Mass.	121	3,180	N	None	--	--	N	New Plant	Preliminary Plans Approved
Turner's Falls Montague (T)	118	4,780	N	None	--	--	N	New Plant	Preliminary Plans Approved
Sunderland (T), Mass.	109	N	N	None	--	--	N	New Plant	Inactive
S. Deerfield, Mass. (Deerfield T)	109	1,800	1,800E	None	--	--	1,800E	New Plant	Preliminary Plans Approved
Amherst (T), Mass.	102	8,000	8,000E	Primary	Satis.	Satis.	4,800E	None	
Northampton (C) Mass.	97	29,000	N	None	--	--	N	New Plant	Final Plans Approved

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Connecticut R. (main stem)									
Easthampton (T) (Mt. Tom Section) Mass.	90	200	200E	None	--	--	200E	New Plant 1/	Final Plans Approved
S. Hadley Falls (S. Hadley T), Mass.	83	6,860	6,860E	None	--	--	6,860E	New Plant	Active Planning
Holyoke (C), Mass.	82	53,750	N	None	--	--	N	New Plant	Active Planning
Chicopee (C), Mass.	74	41,950	N	None	--	--	N	New Plant	Active Planning
Springfield (C), Mass.	71	133,000	N	Primary	Satis.	Satis.	N	None	
W. Springfield (T), Mass.	71	8,000	N	None	--	--	N	New Plant 2/	Preliminary Plans Approved
Agawam (T), Mass.	68	5,700	5,700E	None	--	--	5,700E	New Plant 2/	Active Planning
Longmeadow (T), Mass.	68	5,790	5,790E	None	--	--	5,790E	New Plant	Active Planning
Enfield (T), Conn.	62	(Served by Thompsonville)							
Thompsonville	62	9,500	N	Primary	Unsat.	Unsat.	10,800E	Additions	Undetermined
Windsor Locks (T), Conn.	59	3,500	N	None	--	--	N	New Plant	Final Plans Approved

1/ Pumping station to proposed new Easthampton plant.
2/ Pumping station to Springfield (C), main plant.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Connecticut R. (main stem)									
Bradley Airfield (Windsor Locks T) Conn.	59	880	880E	Secondary	Satis.	Satis.	95	None	
Warehouse Point, Conn. (E. Windsor T)	59	1,000	1,000E	(No Municipal System)			1,000E	New Plant	Inactive
Windsor (T), Conn.	53	5,000	5,000E	None	--	--	5,000E	New Plant 1/	Final Plans Approved
Wilson, Conn. (Windsor Town)	52	200	200E	(No Municipal System)			200E	New Plant 1/	Final Plans Approved
E. Hartford (T) Conn.	47	19,000	19,000E	None	--	--	19,000E	New Plant	Under Construction
Hartford (C), Conn.	47	223,840 2/	N	Primary	Satis.	Satis.	134,260	None	
Wethersfield (T) Conn.	44	7,000	7,000E	Primary	Satis.	Satis.	4,200	None	
Wethersfield (T), Conn.	44	3,055	3,055E	(Served by Hartford)					
Rocky Hill (T), Conn.	38	1,100	1,100E	(Served by Hartford)					

1/ Interceptor to Hartford Metropolitan District System
2/ Hartford (C) Population Served--176,960; total of 223,840 served by Metropolitan District.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Connecticut R. (main stem)									
Drum Hill (PHA) (Rocky Hill T) Conn.	38	650	650E	Primary	Unsat.	Unsat.	520	Additions 1/	Inactive
Portland (T), Conn.	31	2,500	2,500E	None	--	--	2,500E	New Plant	Final Plan Approved
State Hospital Conn. (Middletown T)	31	4,000	N	Primary	Satis.	Satis.	2,400	None	
Middletown (C), Conn.	31	15,500	N	Primary	Satis.	Satis.	N	None	
Middletown (C), Conn.	31	1,300	N	None	--	--	N	New Plant 2/	Final Plans Approved
Essex (T), Conn.	7	1,010	1,010E	(No Municipal System)			1,010E	New Plant	Inactive
Mohawk River (main stem)									
Balsam Hotel, N.H.		900E	900E	Primary	Unsat.	Unsat.	810E	Additions 3/	Inactive
(Dixville T)	C12.5								
Colebrook (T), N.H.	C2	1,600E	1,600E	None	--	--	1,600E	New Plant	Inactive

1/ Connection to Hartford Metropolitan System. 2/ Connection to municipal sewerage system

3/ Requires chlorination.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Nulhegan River (main stem)									
Bloomfield (T), Vt.	C0.5	350	350E	(No Municipal System)			350E	Undet'd.	Inactive
Upper Ammonoosuc R. (main stem)									
Groveton, N.H. (Northumberland T)	C3	1,400	1,400E	None	--	--	1,400E	New Plant	Inactive
Israel River (main stem)									
Jefferson (T), N.H.	C13	180	180E	(No Municipal System)			180E	Individual Treatment	Active Planning
Waumbec Hotel, N.H. (Jefferson T)	C13	225	225E	None	--	--	225E	New Plant	Active Planning
Lancaster (T), N.H.	C2.5	2,100E	2,100E	None	--	--	2,100E	New Plant	Inactive
Neal Brook (main stem)									
Lunenberg (T), Vt.	C2.5	100	100E	None	--	--	100E	Undet'd.	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Johns River (main stem)									
Whitefield (T), N.H.	C7	1,600E	1,600E	None	--	--	1,600E	New Plant	Inactive
Passumpsic River (main stem)									
Lyndonville, Vt. (Lyndon T)	C19.5	1,500	1,850E	None	--	--	1,850E	Undet'd.	Inactive
Lyndon Center, Vt. (Lyndon T)	C19.5	200	200E	None	--	--	200E	Undet'd.	Inactive
St. Johnsbury (V), Vt.	C9	7,250	N	None	--	--	N	New Plant	Inactive
Passumpsic, Vt. (Barnet T)	C5.5	35	35E	None	--	--	35E	Undet'd.	Inactive
Wheelock Branch (Passumpsic R. Basin)									
Lyndon (T), Vt.	P1	100	100E	None	--	--	100E	Undet'd.	Inactive
Andric Brook (Passumpsic R. Basin)									
Danville (T), Vt.	P9	225	225E	None	--	--	225E	Undet'd.	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Wells River (main stem)									
South Ryegate, Vt. (Ryegate T)	C7.5	30	30E	None	--	--	30E	Undet'd.	Inactive
Ammonoosuc River (main stem)									
Mt. Washington Hotel, (Carroll T) N.H.	C43	1,000	1,000E	None 1/	--	--	1,000E	Additions 2/	Active Planning
Bretton Arms Hotel, (Carroll T) N.H.	C43	300	300E	Primary	Unsat.	Unsat.	270E	Additions 2/	Active Planning
Mt. Washington Caddy Camp (Carroll T), NH	C43	70	70E	Primary	Unsat.	Unsat.	65E	Replacement	Active Planning
Carroll (T), N.H.	C43								
Fabyan Hotel		375	375E	None	--	--	375E	New Plant	Active Planning
Twin Mt. Hotel		181	181E	None	--	--	181E	New Plant	Active Planning
Rosebrook Inn		65	65E	None	--	--	65E	New Plant	Active Planning
Wayside Inn		45	45E	None	--	--	45E	New Plant	Active Planning
Y-D Cabins		42	42E	None	--	--	42E	New Plant	Active Planning
Crawford House		420	420E	None	--	--	420E	New Plant	Active Planning

1/ Existing treatment plant not in use; to be reconditioned and chlorination added and in operation in 1952.
2/ Requires chlorination.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Ammonoosuc River (main stem)									
Twin Mt. School, N.H. (Carroll T)	C42	70	24E	None	--	--	24E	New Plant	Active Planning
Carroll Inn (Carroll T), N.H.	C42	48	48E	Primary	Unsat.	Unsat.	48E	Additions	Active Planning
Carroll (T), N.H.	C40	180	180E	(Private Sewers)			180E	Individual Treatment	Active Planning
Bethlehem (T), N.H.	C35	5,000E	5,000E	None	--	--	5,000E	New Plant	Inactive
Littleton (T), N.H.	C24	3,000	3,000E	None	--	--	3,000E	New Plant	Inactive
Lisbon (T), N.H.	C12	1,500E	1,500E	None	--	--	1,500E	New Plant	Inactive
Woodsville, N.H. (Haverhill T)	C0.5	3,000E	3,000E	None	--	--	3,000E	New Plant	Inactive
Waits River (main stem)									
Bradford (T), Vt.	C1.5	690	690E	None	--	--	690E	Undet'd.	Inactive
Lake Morey Outlet									
Lake Morey Inn, Vt. (Fairlee T)	[illegible]	200	200E	Primary	Undet.	Unsat.	N	Addition	Inactive

Name and Pollution	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Girl Brook (main stem)									
Hanover (T), N.H. (part)	C1	1,500E	1,500E	Primary	Undet.	Undet.	1,100E	Addition	Inactive
Mink Brook (main stem)									
Hanover (T), N.H. (part)	C1	3,000E	3,000E	None	--	--	3,000E	New Plant	Inactive
White River (main stem)									
Rochester (T), Vt.	C47	300	N	None	--	--	N	Undet'd.	Inactive
Bethel (T), Vt.	C27	700	N	None	--	--	N	Undet'd.	Inactive
S. Royalton, Vt. (Royalton T)	C19	300	N	None	--	--	N	Undet'd.	Inactive
Hartford (T), Vt.	C2	600	N	None	--	--	N	Undet'd.	Inactive
Third Branch White R. (White River Basin)									
Randolph (T), Vt.	W10	1,850	N	None	--	--	N	Undet'd.	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Mascoma River (main stem)									
Canaan (T), N.H.	C24	N	N	(No Municipal System)			N	Undet'd.	Inactive
Enfield (T), N.H.	C14	300E	300E	(No Municipal System)			300E	New Plant	Inactive
Lebanon (T), N.H.	C5	5,500E	5,500E	None	--	--	5,500E	New Plant	Inactive
Ottauquechee River (main stem)									
Woodstock (V), Vt.	C16	1,200	N	None	--	--	N	Undet'd.	Inactive
Quechee, Vt. (Hartford T)	C7	200	N	None	--	--	N	Undet'd.	Inactive
Sugar River (main stem)									
Sunapee (T), N.H.	C26	1,000E	1,000E	(No Municipal System)			1,000E	None 1/	
Newport (T), N.H.	C20	5,000	5,000E	None	--	--	5,000E	New Plant	Active Planning
Claremont (C), N.H.	C6	9,600	9,600E	Primary	Satis.	Satis.	5,700	Additions	Active Planning

1/ No project required to keep stream in proposed "C" (NEIWPC) Classification.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Croydon Branch Sugar Basin (Sugar River Basin)									
Newport (T), N.H.	S2	N	N	(No Municipal System)			N	Individual Treatment	Active Planning
Croydon (T), N.H.	S8	N	N	(No Municipal System)			N	Individual Treatment	Inactive
Red Water Brook (Sugar River Basin)									
Claremont (T), N.H.	S3.5	N	N	(No Municipal System)			N	Individual Treatment	Active Planning
Ledge Pond Brook (Sugar River Basin)									
Newport (T), N.H.	S2	N	N	(No Municipal System)			N	Individual Treatment	Active Planning
So. Branch Sugar R. (Sugar River Basin)									
Newport (T), N.H.	S4	N	N	(No Municipal System)			N	Individual Treatment	Active Planning
Goshen (T), N.H.	S7	N	N	(No Municipal System)			N	Individual Treatment	Active Planning

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Black River (main stem)									
Ludlow (T), Vt.	C28	1,50C	N	None	--	--	N	Undet'd.	Inactive
Springfield (V), Vt.	C5	5,200	N	None	--	--	N	Undet'd.	Inactive
Whetstone Brook (main stem)									
Brattleboro (T), Vermont 1/	C1	N	N	None	--	--	N	Undet'd.	Inactive
Ashuelot River (main stem)									
Keene (C), N.H.	C29	15,000E	N	Primary	Unsat.	Satis.	N	Additions	Plans Approved
W. Swanzey, N.H. (Swanzey T)	C19	1,000E	1,000E	(No Municipal System)			1,000E	New Plant	Inactive
Winchester (T), N.H.	C8.5	1,000E	1,000E	(No Municipal System			1,000E	New Plant	Inactive
Hinsdale (T), N.H.	C1.5	1,400E	1,400E	None	--	--	1,400E	New Plant	Inactive

1/ Part of town to main stem Conn. R., part to Whetstone Brook, total population shown on Conn. R. (main stem).

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
The Branch (Ashuelot R. Basin)									
Marlboro (T), N.H.	A6	500E	500E	(No Municipal System)			500E	New Plant	Inactive
S. Br. Ashuelot R. (Ashuelot R. Basin)									
Troy (T), N.H.	A15	800	800	(No Municipal System)			800E	New Plant	Inactive
Millers River (main stem)									
Winchendon (T), Mass.	C81	3,000	N	Secondary	Satis.	Satis.	150	None	
Winchendon (T), Mass.	C81	1,120	1,120E	(Private Sewers)			1,120E	New Plant 1/	Action requested March 1951
S. Roylston, Mass. (Roylston T)	C57	150E	150E	None	--	--	N	New Plant	Inactive
Athol (T), Mass.	C42	10,000E	N	None	--	--	N	New Plant	Plans Approved
Athol (T), Mass.	C42	1,490E	1,490E	(Private Sewers)			1,490E	New Plant 1/	Plans Approved
Orange (T), Mass.	C29	4,000E	4,000	None	--	--	4,000E	New Plant	Action requesed March 1951

1/ Requires connection to municipal sewerage system.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Millers River (main stem)									
Orange (T), Mass.	C29	960	960E	(Private Sewers)			960E	New Plant 1/	Action requested March 1951
Erving (T), Mass.	C17	300	300E	None	--	--	300E	New Plant	Action requested March 1951
Otter River (Millers River Basin)									
Gardner (C), Mass.	M10.5	15,000	N	Secondary	Satis.	Satis.	N	None	
Baldwinsville, Mass. (Templeton T)	M4.5	290	N	(No Municipal System)			N	New Plant	Action requested March 1951
Depot Pond (Otter River Basin)									
Hospital Cottages; (Templeton T) Mass.	01	195	195E	Primary	Unsat.	Unsat.	N	New Plant	Inactive
Trout Brook									
Fernald State School (Templeton T), Mass.	02.5	310	310E	Secondary	Satis.	Satis.	16	None	

1/ Requires connection to municipal system.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Deerfield River (main stem)									
Readsboro (T), Vt.	C50.5	400	N	None	--	--	N	Undet'd.	Inactive
Monroe Bridge, Mass. (Monroe T)	C45.5	50E	50E	(No Municipal System)			50E	Individual Treatment	Inactive
Hoosac Tunnel, Mass. (Florida T)	C39	50E	50E	(No Municipal System)			50E	Individual Treatment	Inactive
Charlemont (T), Mass.	C29.5	500E	500E	(No Municipal System)			500E	Individual Treatment	Inactive
Buckland (T), Mass.	C18.5	1,060E	1,060E	(No Municipal System)			1,060E	New Plant	Inactive
Shelburne Falls, Mass. (Shelburne T)	C18.5	900E	900E	None	--	--	900E	New Plant	Inactive
Greenfield (T), Mass.	C2	15,900	15,900E	Primary	Satis.	Satis.	9,440E	None	
Deerfield (T), Mass.	C6	1,160	1,160E	None	--	--	1,160E	New Plant	Preliminary Plans Approved
N. Br. Deerfield R. (Deerfield R. Basin)									
Wilmington (T), Vt.	D2	200	200E	None	--	--	200E	Undet'd.	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
North River (Deerfield R. Basin)									
Colrain (T), Mass.	D6	72E	72E	(No Municipal System)			72E	Individual Treatment	Inactive
Foundry Village, Mass. (Colrain T)	D4.5	60E	60E	(No Municipal System)			60E	Individual Treatment	Inactive
Griswoldville, Mass. (Colrain T)	D3	80E	80E	(No Municipal System)			80E	Individual Treatment	Inactive
Shattuckville, Mass. (Colrain T)	D1.5	28E	28E	(No Municipal System)			28E	Individual Treatment	Inactive
South River (Deerfield R. Basin)									
Ashfield (T), Mass.	D15	120E	150E	(No Municipal System)			150E	Individual Treatment	Inactive
Conway (T)	D5	200E	200E	(No Municipal System)			200E	Individual Treatment	Inactive
Mill River (Hatfield T) (Main stem)									
Hatfield (T), Mass.	C1	2,430	2,430E	None	--	--	2,430	New Plant	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Mill River (Northampton C)									
Williamsburg (T), Mass.	C12	100E	100E	(No Municipal System)			100E	New Plant	Inactive
Leeds, Mass. (Northampton C)	C10	200E	200E	(No Municipal System)			200E	New Plant	Active Planning
Mill River (main stem)									
Hampshire County Sanitarium (Northampton C)	C11	200	200E	Secondary	Satis.	Satis.	10E	None	
Manhan River (main stem)									
Easthampton (T), Mass.	C5	10,315	10,315E	Secondary	Unsat.	Satis.	5,500	Replacement	Plans Approved
Lampson Brook (Bachelor Brook)									
Belchertown (T), Mass.	B2.5	580	580E	(Served by Belchertown) (State School)				None	
Belchertown State School, Mass. (Belchertown T)	B2.5	1,600	1,600E	Secondary	Unsat.	Satis.	480E	Additions 1/	Inactive

1/ Requires chlorination.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. tc Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Stony Brook (main stem)									
So. Hadley (T), Mass.	C2	500	500E	None	--	--	500E	New Plant	Active Planning
Chicopee River (main stem)									
N. Wilbraham, Mass. (Wilbraham T)	C12.5	100	100E	(No Municipal System)			100E	New Plant	Inactive
W. Wilbraham, Mass. (Wilbraham T)	C9.5	200	200E	(No Municipal System)			200E	New Plant	Inactive
Ludlow (T), Mass.	C8.5	6,500	6,500E	Primary	Satis.	Satis.	1,800	None	
Springfield (C), Mass.	C7	16,000	N	Primary	Satis.	Satis.	9,600E	None	
Westover Field (Chicopee C), Mass.	C4	2,000	2,000E	Primary	Satis.	Satis.	1,200	Additions	Inactive
Quaboag River (Chicopee R. Basin)									
Brookfield (T) Mass.	C23.5	50	50 E	(No Municipal System)			50E	New Plant	Inactive
W. Brookfield (T), Mass.	C20	50	50E	(No Municipal System)			50E	Individual Treatment	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Quaboag River (Chicopee R. Basin)									
Warren (T), Mass.	C16	100	100E	None	--	--	100E	New Plant	Active Planning
W. Warren, Mass. (Warren T)	C14	50	50E	None	--	--	50E	New Plant	Active Planning
Monson State Hospital (Monson T), Mass.	C4	1,850	1,850E	Secondary	Satis.	Satis.	170	None	
Monson Academy (Monson T), Mass.	C4	N	N	None	--	--	N	New Plant	Undetermined
Palmer (T), Mass.	C2.5	500	500E	None	--	--	500E	New Plant	Inactive
Seven Mile River (To E. Brookfield R. To Quaboag River-Chicopee R. Basin)									
Spencer (T), Mass.	Q4	6,000	6,000E	Secondary	Satis.	Satis.	230	None	
Dunn Brook (Chicopee R. Basin)									
N. Brookfield (T), Mass.	Q4	2,000	2,000E	Secondary	Satis.	Satis.	500E	None	

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. te Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Chicopee Brock (Chicopee R. Basin)									
Monson (T), Mass.	Q4	200	200E	(No Municipal System)			200E	New Plant	Plans Approved
Ware River (Chicopee R. Basin)									
S. Barre, Mass. (Barre T)	C28.5	75	75E	(No Municipal System)			75E	New Plant	Inactive
Wheelwright, Mass. (Hardwick T)	C24.5	100	100E	None	--	--	100E	New Plant	Inactive
Gilbertville, Mass. (Hardwick T)	C17.5	400	400E	None	--	--	400E	New Plant	Inactive
Ware (T), Mass.	C12.5	6,000	6,000E	None	--	--	6,000E	New Plant	Active Planning
Thorndike, Mass. (Palmer T)	C2.5	800	800E	None	--	--	800E	New Plant	Inactive
Three Rivers, Mass. (Palmer T)	C0.2	1,200	1,200E	None	--	--	1,200E	New Plant	Inactive
Prince River (Chicopee R. Basin)									
Barre (T), Mass.	W4	1,000	1,000E	(No Municipal System)			1,000E	New Plant	Inactive

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Swift River (Chicopee R. Basin)									
Bondsville, Mass. (Palmer T)	W3.5	1,000	1,000E	None	--	--	1,000E	New Plant	Inactive
Westfield River (main stem)									
Chester (T), Mass.	C31.5	200	200E	(No Municipal System)			200E	New Plant	Active Planning
Huntington (T), Mass.	C26	1,600	1,000E	None	--	--	1,000E	New Plant	Active Planning
Russell (T), Mass.	C21.5	1,000	1,000E	None	--	--	1,000E	New Plant	Active Planning
Westfield (C), Mass.	C12.5	18,790	18,790E	None	--	--	18,790E	New Plant	Plans Approved
W. Springfield (T), Mass.	C3.5	9,140	9,140E	None	--	--	9,140E	New Plant 1/	Preliminary Plans Approved
Agawam (T), Mass.	C3.5	1,500	1,500E	None	--	--	1,500E	New Plant 1/	Under Construction (now inactive)
Unnamed Brook (Westfield R. Basin)									
Westfield State Sanitorium, Mass. (Westfield C)	W1	390	390E	Secondary	Satis.	Satis.	20E	None	

1/ Pumping station to Springfield (C), main plant.

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Watercourse**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Pecousic Brook (main stem)									
E. Longmeadow (T), Mass.	C6	3,000	3,000E	Secondary	Satis.	Satis.	450E	None	
Fresh Water Brook (main stem)									
Osborn Prison Farm (Enfield T), Conn.	C6	175	175E	Secondary	Satis.	Satis.	20E	None	
Stony Brook (main stem)									
Suffield (T), Conn.	C4	N	N	(No Municipal System)			N	Individual Treatment	Undetermined
Broad Brook (Scantic R. Basin)									
Broad Brook, Conn. (E. Windsor T)	S1	1,100	1,100E	Primary	Satis.	Satis.	660	None	
Farmington River (main stem)									
Collinsville, Conn. (Canton T)	C43.5	100	100E	(No Municipal System)			100E	New Plant	Undetermined
Unionville, Conn. (Farmington T)	C37.5	100	100E	(No Municipal System)			100E	New Plant	Undetermined

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Farmington River (main stem)									
Farmington (T), Conn.	C33	1,200	1,200E	None	--	--	1,200E	New Plant	Final Plans Approved
Avon (T), Conn.	C26	400	400E	Secondary	Satis.	Satis.	40E	None	
Avon (T), Conn.	C26	130	130E	Secondary	Satis.	Satis.	15E	None	
Simsbury (T), Conn.	C20	870	870E	Primary	Satis.	Satis.	600	None	
Simsbury (T), Conn.	C20	1,100	1,100E	Secondary	Satis.	Satis.	55	None	
Tariffville, Conn. (Simsbury T)	C15	600	600E	Primary	Satis.	Satis.	400	None	
Poquonock, Conn. (Windsor T)	C8	250	250E	(No Municipal System)			250E	New Plant	Undetermined
W. Br. Farmington R.									
N. Hartford (T), Conn.	F2	200	200E	(No Municipal System)			200E	New Plant	Undetermined
Still River (Farmington R. Basin)									
Winsted (C), Conn.	W.B.F.6	6,000	6,000E	None	--	--	6,000E	New Plant	Under Construction

Name and Location	River Mile Above Mouth Outlet Site	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Pequabuck River (Farmington R. Basin)									
Pequabuck, Conn. (Plymouth T)	F14	N	N	(No Municipal System)			N	New Plant	Active Planning
Bristol (C), Conn.	F9.5	25,000	25,000E	Secondary	Satis.	Satis.	3,500	None	
Forestville, Conn. (Bristol T)	F7.5	N	N	(Served by Bristol Conn.)					
Plainville (T), Conn.	F5.5	250 1,000	250E 1,000	Secondary Primary	Satis. Satis.	Satis. Satis.	150 600	None None	
Salmon Brook (Farmington R. Basin)									
Granby (T), Conn.	F4	200	200E	Primary	Satis.	Satis.	120E	None	
N. Br. Park River (Park R. Basin)									
Bloomfield (T), Conn.	P9	1,455	1,455	(Served by Hartford M.D.)			870	--	
St. Thomas Seminary (Bloomfield T) Conn.	P7	400	400E	Secondary	Satis.	Satis.	40	None	
Piper Brook (Park R. Basin)									
Newington (T), Conn.	S.B.P.4	50	50E	(Served by Hartford M.D.)			30	--	

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Piper Brook (Park R. Basin)									
U.S. Veterans Hospital, (Newington T) Conn.	S.B.P.4	475	475	Secondary	Satis.	Satis.	50	None	
Mill Brook (Park R. Basin)									
Home for Crippled Children, (Newington T), Conn.	P.B. 3	210	210E	Secondary	Satis.	Satis.	20	None	
Unnamed Brook (Park R. Basin)									
State Sanitarium, (Newington T), Conn.	S.B.P.5	570	570E	Secondary	Satis.	Satis.	60	None	
Trout Brook (Park R. Basin)									
W. Hartford (T), Conn.	S.B.P.3	41,220	41,220	(Served by Hartford)			24,730		
Hockanum River (main stem)									
Rockville (C), Conn.	C21	8,200	N.	Primary	Unsat.	Satis.	N	Replacement	Final Plans Approved

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water-course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Hockanum River (main stem)									
Manchester (T), Conn. (north plant)	C11	10,550	10,550E	Primary	Unsat.	Satis.	6,000	Addition	Active Planning
Manchester (T), Conn. (south plant)	C8.5	19,200	19,200E	Primary	Unsat.	Satis.	14,800	Addition	Inactive
United Homes FHA E. Hartford (T), Conn.	C6.5	300	300E	Primary	Satis.	Satis.	180	None	
Salmon Brook (main stem)									
Glastonbury (T), Conn.	C1	300	300E	(No Municipal System)			300E	New Plant	Undetermined
Roaring Brook (main stem)									
S. Glastonbury, Conn. (Glastonbury T)	C1	100	100E	(No Municipal System)			100E	Individual Treatment	Undetermined
Hog Brook (main stem)									
State Veterans Home, (Rocky Hill T), Conn.	C1.5	800	800E	Primary	Satis.	Satis.	480	None	

Name and Location	River Mile Above Mouth Outlet Stream	Population Served by Sewers	P.E. (B.O.D.) Untreated Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities		P.E. (B.O.D.) Disch'd. to Water. course**	Treatment Needs	Current Status Municipal* Action
					Cap'y.	Opr.			
Mattabessett R. (main stem)									
New Britain (C), Conn.	C11	73,660	N	Intermediate	Unsat.	Satis.	N	Additions	Undetermined
Coquinchaug R. (Mattabessett R. Basin)									
Middletown (C), Conn. (Washington St. Plant)	M2.5	2,200	2,200E	Primary	Satis.	Satis.	1,320	None	
Pattaconck Creek (main stem)									
Chester (T), Conn.	C2.5	590	590E	(No Municipal System)			590E	New Plant	Undetermined
Deep River (main stem)									
Deep R. (T), Conn.	C2	1,765	1,765E	(No Municipal System)			1,765E	New Plant	Undetermined

*Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

**Includes industrial wastes discharged into municipal sewerage systems.

N--Information not available or undetermined.
E--Estimated population equivalent.

APPENDIX B

BASIC DATA ON SOURCES OF INDUSTRIAL* POLLUTION

CONNECTICUT RIVER BASIN

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Connecticut River (Main Stem)									
Northumberland (T), N.H. -Wyoming Valley Paper Mill, Inc.	325	Paper and Allied Products	Organic	None	-	-	N	New Plant	Inactive
Gilman (Lunenberg T), Vt. -Paper Mill	303	Paper and Allied Products	Organic	None	-	-	N	Undet'd.	Inactive
Barnet(T), Vt. -Dairy	281	Food and Kindred Products	Organic	None	-	-	N	Undet'd.	Inactive
McIndoe Falls, Vt. (Barnet, T) -Undet'd.	278	Undet'd.	Undet'd.	-	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy: Cap'y.	Adequacy: Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Connecticut River (Main Stem)									
E. Ryegate, Vt. (Ryegate T) -Paper Mill	273	Paper and Allied Products	Organic	None	-	-	N	Undet'd.	Inactive
Wells River, Vt. (Newbury T) -Dairy	269	Food and Kindred Products	Undet'd.	N	-	-	N	Undet'd.	Inactive
Newbury(T), Vt. -Cheese Mfg.	259	Food and Kindred Products	Organic	None	-	-	N	Undet'd.	Inactive
Piermont Station Vt. (Bradford T) -Milk & Butter Mfg.	245	Food and Kindred Products	Organic	None	-	-	N	Undet'd.	Inactive
Windsor (T), Vt. -Rubber Heel Mfg.	201	Rubber Products	Organic	None	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y	Adequacy Opr.			
Connecticut River (Main Stem)									
N.Walpole, N.H. (Walpole T) -Vermont Packing Co.	175	Food,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Bellows Falls(V) Vt.									
-Poultry Slaughter-house	175	Food,etc.	Organic	None	-	-		Undet'd.	Inactive
-Creamery	175	Food,etc.	Undet'd.	None	-	-		Undet'd.	Inactive
-Paper Mill	175	Paper,etc.	Organic	None	-	-		Undet'd.	Inactive
-Paper Mfg.	175	Paper,etc.	Organic	Primary	Undet'd	Un-det'd	N	Undet'd.	Inactive
Brattleboro(T) Vt.									
-Optical Glass	151	Miscellaneous	Inorganic	Primary	Undet'd	Un-det'd	N	Undet'd.	Inactive
-Dairy	151	Food,etc.	Organic	None	-	-	40	Undet'd.	Inactive
-Cleaning Fluid and Shoe White	150	Chemical, etc.	Organic	None	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y	Opr.			
Connecticut River (Main Stem)									
Turners Falls, (Montague T), Mass.									
-Paper Mill	121	Paper, etc.	Organic	None	-	-	N	Connect'n to Municipal System	Active planning
-Paper Mill	121	Paper, etc.	Organic	None	-	-	N	"	"
Northampton(C), Mass.									
-Sulphite Pulp	97	Paper, etc.	Organic	None	-	-	N	New plant	Inactive
South Hadley(T), Mass.									
-Paper Mill	83	Paper, etc.	Organic	None	-	-	N	Connect'n to Municipal Sewers	Active planning
-Paper Mill	83	Paper, etc.	Organic	None	-	-	N	"	"
-Paper Mill	83	Paper, etc.	Organic	None	-	-	N	"	"

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd to Water-course	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y	Opr.			
Connecticut River (Main Stem)									
Holyoke(C), Mass.									
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	Connection to Municipal Sewer	Active planning
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
-Paper Mill	82	Paper,etc.	Organic	None	-	-	N	"	"
Chicopee(C),Mass.									
-Rendering Co.	76	Chemical,etc.	Organic	None	-	-	N	"	Inactive
-Brewing Co.	76	Food,etc.	Organic	None	-	-	N	"	Inactive
-Slaughterhouse	76	Food,etc.	Organic	None	-	-	N	Connection to Municipal Sewers plus pre-treatment	Under construction
Windsor Locks(T), Conn.									
-C.H.Dexter & Sons, Inc.	59	Paper,etc.	Organic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Connecticut River (Main Stem)									
Windsor Locks (T), Conn. Continued									
-The Montgomery Co.	59	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Windsor Locks Paper Co.	59	Paper, etc.	Organic	None	-	-	N	New plant	Undet'd.
-George P. Clark Co.	59	Machinery	San. sewage	None	-	-	22	Connect'n. to Mun. Sys.	Undet'd.
-E. Horton & Son Co., Inc.	59	Machinery	" "	None	-	-	15	"	Undet'd.
-Gabb Mfg. Co.	59	Machinery	" "	None	-	-	5	"	Undet'd.
Rocky Hill (T), Conn.									
-Conn. Foundry Co.	38	Primary Metal Industries	Inorganic	None	-	-	N	New plant	Undet'd.
-Hartford Rayon Corp.	38	Textile Mill Products	Inorganic	None	-	-	N	New plant	Undet'd.
Cromwell (T), Conn.									
-The J & E Stevens Co.	34	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y	Opr.	P.E. (B.O.D.) Disch'd to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Connecticut River (Main Stem)									
Essex(T), Conn.									
-The Essex Boat Works, Inc.	7	Miscellaneous	San.Sewage	None	-	-	5	New plant	Undet'd.
-Essex Marine Railway, Inc.	7	Miscellaneous	San.Sewage	None	-	-	3	New plant	Undet'd.
-Essex Boat Dock	7	Miscellaneous	San.Sewage	Primary	Sat.	Sat.	N	None	
Old Saybrook(T), Conn.									
-Saybrook Laundry, Inc.	2	Miscellaneous	Organic	None	-	-	N	New plant	Undet'd.
Upper Ammonoosuc River (Main Stem)									
Groveton, N.H. (Northumberland T)									
-Groveton Paper Co.	63	Paper, etc.	Organic	None	-	-	N	New plant	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy				
					Cap'y	Opr.			
Johns River: (Main Stem)									
Whitefield(T), N.H. -Mellin-Quincy Mfg. Co., Inc.	C7	Furniture, etc.	San. Sewage	Primary	Unsat.	Undet'd	N	Additions	Inactive
Passumpsic River: (Main Stem)									
E. Burke, Vt. (Burke T) -Lumber	C25	Lumber, etc.	Undet'd	None	-	-	N	Undet'd.	Inactive
Lyndonville, Vt. (Lyndon T) -Gravel Washing Plant	C19.5	Miscellaneous	Inorganic	None	-	-	N	Undet'd.	Inactive
-Creamery	C19.5	Food, etc.	Organic	None	-	-	3000E	Undet'd.	Inactive
-Taps & Dies	C19.5	Machinery except electrical	Organic	None	-	-	N	Undet'd.	Inactive

Name and Location	Rt or Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy: Cap'y	Adequacy: Opr.	P.E. (B.O.D.) Disch'd to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Passumpsic River (Main Stem)									
St.Johnsbury(V), Vt. -Dairy	C9	Food,etc.	Organic	None	-	-	150E	Undet'd.	Inactive
Moose River (Passumpsic River Basin)									
Concord(T),Vt. -Dairy	P10	Food,etc.	Organic	None	-	-	100E	None	Inactive
-Casein Mfg.	P10	Food,etc.	Organic	Primary	Un-det'd	Un-det'd	30,000E	Enlargement	Inactive
Sleepers River (Passumpsic River Basin)									
St.Johnsbury(V), Vt. -Dairy	P3	Food,etc.	Organic	None	-	-	150E	New plant	Inactive
Andric Brook (Passumpsic River Basin)									
Danville(T),Vt. -Milk Receiving Station	P9	Food,etc.	Organic	None	-	-	125E	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Stevens River (Main Stem)									
W.Barnet, Vt. (Barnet T) -Milk Receiving Station	C7	Food,etc.	Organic	None	-	-	100E	Undet'd.	Inactive
Peacham(T),Vt. -Sawmill	C8	Lumber,etc.	Organic	None	-	-	N	New plant[1]	Inactive
Wells River (Main Stem)									
Groton(T),Vt. -Milk Receiving Station	C11	Food,etc.	Organic	None	-	-	50E	Undet'd.	Inactive
S.Ryegate,Vt. (Ryegate T) -Cottage Cheese Mfg.	C7	Food,etc.	Organic	None	-	-	65,000E	New plant	Active Planning

[1] Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y	Opr.			
Wells River (Main Stem)									
Wells River, Vt. (Newbury T) -Paper Mill	C 1	Paper, etc.	Organic	None	-	-	N	New plant	Inactive
Ammonoosuc River (Main Stem)									
Carroll(T), N.H. -Crawford Garage	C43	Miscellaneous	Organic	None	-	-	15E	New plant	Inactive
Littleton(T), N.H. -Saranac Glove Co.	C24	Leather, etc.	Organic	None	-	-	122E	Connection to Municipal Sewers	Inactive
-Norton Pike Co.	C24	Miscellaneous	Inorganic	None	-	-	N	"	Inactive
Waits River (Main Stem)									
Waits River, Vt. (Topsham T) -Sawmill	C15	Lumber, etc.	Organic	None	-	-	N	New plant[1/]	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Waits River (Main Stem)									
Bradford(T),Vt. -Milk Receiving Station	C1.5	Food,etc.	Organic	None	-	-	150E	Undet'd.	Inactive
Ompompanoosuc River (Main Stem)									
Vershire(T),Vt. -Sawmill	C23	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
W.Fairlee(T), Vt. -Dairy	C15	Food,etc.	Organic	None	-	-	110E	Undet'd.	Inactive
Post Mills,Vt. (Thetford T) -Bobbins Mfg.	C12	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy				
					Cap'y.	Opr.			
West Branch Ompompanoosuc River (Ompompanoosuc River Basin)									
S. Strafford, Vt. (Strafford T) -Copper Mine and Mill	08	Primary Metal	Organic & Inorganic	Primary	Un-det'd	Un-det'd	N	Undet'd.	Inactive
White River (Main Stem)									
Granville(T),Vt. -Sawmill	C57	Lumber,etc.	Organic	None	-	-	N	New plant[1/]	Inactive
S. Royalton,Vt. (Royalton T) -Undet'd.	C19	Undet'd.	Undet'd.	-	-	-	N	Undet'd.	Inactive
Hartford(T),Vt. -Wool Cloth Mfg.	C2	Textile,etc.	Organic	None	-	-	N	New plant	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy: Cap'y	Adequacy: Opr.	P.E. (B.O.D.) Disch'd to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Tweed River (White River Basin)									
Stockbridge(T), Vt. -Sawmill	W3	Lumber,etc.	Organic	None	-	-	N	New plant 1/	Inactive
Third Branch White River (White River Basin)									
Bethel(T),Vt. -Sawmill	W1	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Ayers Brook (Third Branch White River)									
E.Braintree,Vt. (Braintree T) -Sawmill	W6	Lumber,etc.	Organic	None	-	-	N	New plant 1/	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Second Branch White River (White River Basin)									
E.Randolph,Vt. (Randolph T) -Milk Receiving Station	W11	Food,etc.	Organic	None	-	-	200E	Undet'd.	Inactive
First Branch White River (White River Basin)									
Chelsea(T),Vt. -Condensed Milk Mfg.	W16	Food,etc.	Organic	None	-	-	125E	Undet'd.	Inactive
Tunbridge(T),Vt. -Milk Receiving Station	W7	Food,etc.	Organic	None	-	-	150E	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
First Branch White River (White River Basin)									
S.Royalton,Vt. (Royalton T) -Sawmill	W1	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Mascoma River (Main Stem)									
Enfield(T),N.H. -American Woolen Co.	C14	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
-American Excelsior Corp.	C14	Lumber,etc.	San. Sewage	None	-	-	N	Undet'd.	Inactive
Lebanon(T),N.H. -American Woolen Co.	C5	Textile,etc.	Organic	None	-	-	N	Connection to Municipal Sewer	Inactive
-E.Cummings Leather Co.	C5	Leather,etc.	Organic	None	-	-	N	"	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy				
					Cap'y.	Opr.			
Mascoma River (Main Stem)									
Lebanon(T),N.H. (Continued)									
-Densmore Brick Co.	C5	Miscellaneous	Inorganic	None	-	-	N	Connection to Municipal Sewer	Inactive
-Lebanon Woolen Co.	C5	Textile,etc.	Organic	None	-	-	N	"	Inactive
-Mascoma Woolen Mills Co.	C5	Textile,etc.	Organic	None	-	-	N	"	Inactive
Ottauquechee River (Main Stem)									
Plymouth (T),Vt.									
-Sawmill	C28	Lumber,etc.	Organic	None	-	-	N	New plant [1]	Inactive
Bridgewater(T),Vt.									
-Woolen Cloth Mfg.	C25	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
Woodstock(V),Vt.									
-Dairy	C15	Food,etc.	Organic	None	-	-	50E	Undet'd.	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Out-let Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Lulls Brook (Main Stem)									
Hartland(T),Vt. -Sawmill	C2	Lumber,etc.	Organic	None	-	-	N	New plant 1/	Inactive
Bashan Brook (Main Stem)									
Windsor(T),Vt. -Dairy	C0.5	Food,etc.	Organic	None	-	-	100E	Undet'd.	Inactive
Mill Brook (Main Stem)									
Brownsville,Vt. (W.Windsor T) -Sawmill	C8	Lumber,etc.	Organic	None	-	-	N	New plant 1/	Inactive
Windsor(T),Vt. -Creamery	C1	Food,etc.	Organic	None	-	-	175E	Undet'd.	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y.	Opr.			
Sugar River (Main Stem)									
Newport(T),N.H.									
-Brampton Woolen Co.	C20	Textile,etc.	Organic	None	-	-	570	Connection to Municipal Sewers	Active planning
-International Shoe Co.	C20	Leather,etc.	San. Sewage	None	-	-	100	"	"
-Dorr Woolen Co.	C20	Textile,etc.	Organic	None	-	-	10,025	New plant	"
-A. Caplan Dusting Mill	020	Textile,etc.	Organic	None	-	-	N	New plant	"
Claremont(C),N.H. -Claremont Waste Mfg. Co.	C 6	Textilo,etc.	Organic	None	-	-	470	Connection to Municipal Sewers	"
-Claremont Paper Co.	C 6	Papor, etc.	Organic	None	-	-	1,345	"	"
-Joy Mfg. Co.	C 6	Machinery,etc.	San.Sewage	None	-	-	325E	"	"
-Dartmouth Woolen Mills	C 6	Textile,etc.	Organic	None	-	-	9,700	"	"
-Coy Paper Co.	C 6	Paper,etc.	Organic	None	-	-	382	Now plant	"
Black River (Main Stem)									
Ludlow(T),Vt.									
-Sawmill	C28	Lumber,etc.	Organic	Nono	-	-	N	Now plant[1/]	Inactive

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1/ Romove sawdust pile from River's odge.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Black River (Main Stem)									
Ludlow(T),Vt. -Woolen Mill		Textile,etc.	Organic	None	-	-	N	New plant	Inactive
Smithville,Vt. (Ludlow T) -Woolen Mill	C26	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
Proctorsville,Vt. (Cavendish T) -Sawmill	C23	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Cavendish(T),Vt. -Woolen Mill	C22	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
-Sawmill	C21	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
N.Springfield,Vt. (Springfield T) -Dairy	C 8	Food,etc.	Organic	None	-	-	500E	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Adequacy Opr.			
Black River (Main Stem)									
Springfield(V), Vt.									
-Gear Finishing	C5	Machinery, etc.	Inorganic	None	-	-	N	Undet'd.	Inactive
-Machinery Mfg.	C5	Machinery, etc.	Inorganic	None	-	-	N	Undet'd.	Inactive
-Woolen Mill	C5	Textile, etc.	Organic	None	-	-	N	New plant	Inactive
-Tool Mfg.	C5	Machinery, etc.	Inorganic	None	-	-	N	Undet'd.	Inactive
Branch Brook (Black River Basin)									
Healdville, Vt. (Mount Holley T)									
-Cheese Mfg.	B5	Food, etc.	Organic	None	-	-	N	New plant	Inactive
South Branch Williams River (Williams River Basin)									
Chester(T), Vt.									
-Sawmill	W5	Lumber, etc.	Organic	None	-	-	N	New plant 1/	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Opr.			
Saxtons River (Main Stem)									
Saxtons River, Vt. (Rockingham T)									
-Sawmill	C 6	Lumber, etc.	Organic	None	-	-	N	New plant 1/	Inactive
-Wood Turning	C 6	Lumber, etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Dairy	C 6	Food, etc.	Organic	None	-	-	50E	Undet'd.	Inactive
Gageville, Vt. (Westminster T)									
-Basket Mfg.	C 1	Lumber, etc.	Organic	None	-	-	N	Undet'd.	Inactive
Bellows Falls(V), Vt.									
-Paper Mill	C 0.5	Paper, etc.	Organic	None	-	-	N	Undet'd.	Inactive
S.Branch Saxtons River (Saxtons River Basin)									
Townshend(T), Vt.									
-Sawmill	S 6	Lumber, etc.	Organic	None	-	-	N	Undet'd.	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Sacketts Brook (Main Stem)									
Putney(T), Vt. -Paper Mill	C1.5	Paper, etc.	Organic	None	-	-	N	Undet'd.	Inactive
West River (Main Stem)									
Londonderry(T), Vt. -Sawmill	C 40	Lumber, etc.	Organic	None	-	-	N	New plant 1/	Inactive
W. Townshend, Vt. (Townshend T) -Sawmill	C 22	Lumber, etc.	Organic	None	-	-	N	Undet'd.	Inactive
Brattleboro(T), Vt. -Milk Receiving Station	C 1	Food, etc.	Organic	None	-	-	200E	Undet'd.	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy: Cap'y.	Adequacy: Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Whetstone Brook (West River Basin)									
W. Wardsboro, Vt. (Wardsboro T) -Sawmill	W 9	Lumber, etc.	Organic	None	-	-	N	New plant 1/	Inactive
Wardsboro(T), Vt. -Sawmill	W 4	Lumber, etc.	Organic	None	-	-	N	New plant 1/	Inactive
-Sawmill	W 3	Lumber, etc.	Organic	None	-	-	N	" "	Inactive
Newfane(T), Vt. -Sawmill	W 3	Lumber, etc.	Organic	None	-	-	N	" "	Inactive
Rock River (West River Basin)									
E. Dover, Vt. (Dover T) -Sawmill	W 9	Lumber, etc.	Organic	None	-	-	N	" "	Inactive
Marlboro Branch **Rock River** (West River Basin) Marlboro(T), Vt. -Sawmill	R 4	Lumber, etc.	Organic	None	--	-	N	" "	Inactive

1/ Remove sawdust pile from River's edge

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy				
					Cap'y.	Opr.			
Whetstone Brook (Main Stem)									
Brattleboro(T),Vt.									
-Sawmill	C 3	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Ashuelot River (Main Stem)									
Keene(C),N.H.									
-Faulkner & Colony Mfg.Co.	C29	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Public Service Co.	C29	Miscellaneous	Organic	None	-	-	N	Undet'd.	Inactive
-R.C. Swan Co.	C29	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
W.Swanzey,N.H. (Swanzey T)									
-Homestead Woolen Co.	C19	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Wincester(T),N.H.									
-A.C. Lawrence Leather Co.	C8.5	Leather,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-N.E. Box Co.	C8.5	Paper,etc.	Undet'd.	None	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y.	Opr.			
Ashuelot River (Main Stem)									
Hinsdale(T),N.H. -Ashuelot Paper Co.	Cl.5	Paper,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Hinsdale Paper Co.	Cl.5	Paper,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Paper Service Co.	Cl.5	Paper,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Robertson Co.	Cl.5	Paper,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-White Washborne Co.	Cl.5	Paper,etc.	Organic	None	-	-	N	Undet'd.	Inactive
The Branch (Ashuelot River Basin)									
Marlboro(T),N.H. -Essex Yarn Co.	A6	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-J.M.Geilenberg Co.	A6	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Medford-Marlboro Knit Gaiter Inc.	A6	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y	Opr.			
The Branch (Ashuelot River Basin)									
Marlboro(T),N.H. **Continued**									
-Minnewawa Mfg. Co.	A 6	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Monadnock Blanket Co.	A 6	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
South Branch Ashuelot River (Ashuelot River Basin)									
Troy(T),N.H.									
-Troy Blanket Mills	A15	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Millers River (Main Stem)									
Winchendon(T),Mass.									
-Cotton Mill	C18	Textile,etc.	Organic	None	-	-	N	Connection to Municipal System	Action requested March 1951

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Millers River (Main Stem)									
Winchendon(T),Mass. (Continued)									
-Wood Toys & Chairs	C81	Furniture,etc.	San.Sewage	None	-	-	N	Connection to Municipal System	Action requested March 1951
-Bobbins & Spools	C81	Lumber,etc.	San.Sewage	None	-	-	N	"	"
-Woodworking Machinery	C81	Machinery,etc.	Inorganic	None	-	-	N	"	"
Athol(T),Mass.									
-Drills & Tools	C42	Fabricated,etc.	Undet'd.	None	-	-	N	"	"
-Saws & Tools	C42	Fabricated,etc.	Inorganic	None	-	-	N	"	"
-Coated Textiles	C42	Textiles,etc.	Inorganic	None	-	-	N	"	"
-Toys & Boxes	C42	Miscellaneous	Inorganic	None	-	-	N	"	"
Orange(T), Mass.									
-Iron Castings	C29	Primary,etc.	Inorganic	None	-	-	N	"	"
-Valve Machines	C29	Fabricated,etc.	Inorganic	None	-	-	N	"	"
-Bicycle Parts	C29	Miscellaneous	Inorganic	None	-	-	N	"	"
Erving(T),Mass.									
-Paper Mill	C17	Paper,etc.	Organic	None	-	-	N	New plant	"
-Wood Shoe Heels	C17	Lumber,etc.	San.Sewage	None	-	-	50E	Connection to Municipal System	"

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Opr.			
Millers River (Main Stem)									
Millers Falls, Mass. (Erving T)									
-Paper Mill	C2	Paper, etc.	Organic	None	-	-	N	New plant	Action requested March, 1951
-Tool Mfg.	C2	Fabricated, etc.	Inorganic	None	-	-	N	Connection to Municipal System	"
Otter River (Millers River Basin)									
Gardner(C), Mass.									
-Stove Mfg.	M10.5	Miscellaneous	Inorganic	None	-	-	N	"	"
-Metal Plating	M10.5	Fabricated	Inorganic	None	-	-	N	"	"
-Cribs & Cradles	M10.5	Furniture, etc.	Inorganic	None	-	-	N	"	"
-Furniture	M10.5	Furniture, etc.	Inorganic	None	-	-	N	"	"
-Furniture	M10.5	Furniture, etc.	Inorganic	None	-	-	N	"	"
-Furniture	M10.5	Furniture, etc.	Inorganic	None	-	-	N	"	"
-Oil Storage	M10.5	Miscellaneous	Inorganic	None	-	-	N	"	"

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Otter River (Millers River Basin)									
Baldwinsville, Mass. (Templeton T) -Paper Mill	M4.5	Paper, etc.	Organic	None	-	-	N	Connection to Municipal System	Action requested March 1951
-Paper Mill	M4.5	Paper, etc.	Organic	None	-	-	N	"	"
Deerfield River (Main Stem)									
Monroe Bridge, Mass. (Monroe T) -Paper Mill	C45.5	Paper, etc.	Organic	None	-	-	N	New plant	Inactive
Shelburne Falls, Mass. (Shelburne T) -Cutlery	C18.5	Fabricated, etc.	Undet'd.	None	-	-	N	Undet'd.	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y.	Opr.			
North River (Deerfield River Basin)									
Colrain(T),Mass. -Cotton Mill	D 6	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
East Branch North River (Deerfield River Basin)									
Jacksonville,Vt. (Whitingham T)									
-Sawmill	D19	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Dairy	D19	Food,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Halifax(T),Vt.									
-Sawmill	D16	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
-Sawmill	D16	Lumber,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Manhan River (Main Stem)									
Easthampton(T), Mass. -Textile Mill	C 5	Textile,etc.	Organic	None	-	-	N	Connection to Municipal System	Final plans approved

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Manhan River (Main Stem)									
Easthampton(T), Mass. (Cont.) -Textile Mill	C5	Textile,etc.	Organic	None	-	-	N	Connection to Municipal System	Final plans approved
-Rubber Thread Mfg.	C5	Textile,etc.	Organic	None	-	-	N	"	"
-Felt Mill	C5	Textile,etc.	Organic	None	-	-	N	"	"
-Webbing Mill	C5	Textile,etc.	Organic	None	-	-	N	"	"
Bachelor Brook (Main Stem)									
S.Hadley(T),Mass. -Paper Mill	C2	Paper,etc.	Organic	None	-	-	N	New plant	Inactive
Stony Brook (Main Stem) S.Hadley(T),Mass. -Paper Mill	C2.5	Paper,etc.	Organic	None	-	-	N	Connection to Municipal System	Active planning

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y.	Opr.			
Chicopee River (Main Stem)									
N. Wilbraham, Mass. (Wilbraham T)									
-Plastic Housewares	C12.5	Miscellaneous	Undet'd.	None	-	-	N	New plant	Undet'd.
-Dawn Wire & Rod	C12.5	Primary, etc.	Undet'd.	None	-	-	N	New plant	Undet'd.
Springfield(C), Mass.									
-Undet'd.	C7	Undet'd.	Undet'd.	None	-	-	N	New plant	Active planning
-Plastics Mfg.	C7	Chemical, etc.	Organic	None	-	-	N	New plant	"
-Resins Mfg.	C7	Chemical, etc.	Organic	None	-	-	N	New plant	"
Chicopee(C), Mass.									
-Sporting Arms	C4	Miscellaneous	Undet'd.	None	-	-	N	Connection to Municipal System	Inactive[1]
-Rubber Tires	C3	Rubber Products	Undet'd.	None	-	-	N	"	"

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[1] Dependent on action taken by Chicopee city.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y,	Opr.			
Quaboag River (Chicopee River Basin)									
Brookfield(T), Mass.									
-Paper Coasters	C23.5	Paper,etc.	Organic	None	-	-	N	Connection to Municipal System	Inactive
W.Brookfield(T), Mass.									
-Wire Co.	C20	Fabricated,etc.	Inorganic	None	-	-	N	New plant	"
-Yeast Plant	C20	Food,etc.	Organic	None	-	-	N	New plant	"
Warren(T),Mass.									
-Pump Mfg.	C16	Machinery,etc.	San.Sewage	None	-	-	67E	Connection to Municipal System	Inactive1/
W.Warren,Mass. (Warren T)									
-Textile Mill	C14	Textile,etc.	Organic	None	-	-	2,000E	"	"
-Textile Mill	C14	Textile,etc.	Organic	None	-	-	450E	"	"
-Cotton Mill	C14	Textile,etc.	Organic	None	-	-	N	"	"
-Textile Mill	C14	Textile,etc.	Organic	None	-	-	N	"	"

1/ Dependent on action taken by Warren Town

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution-Abatement Needs	Current Status Industrial Action
Quaboag River (Chicopee River Basin)									
Palmer(T),Mass.									
-Brushes & Mops	C2.5	Miscellaneous	San.Sewage	None	-	-	N	New plant	Inactive
-Steel Wire	C2.5	Primary,etc.	Inorganic	None	-	-	N	New plant	Inactive
Seven Mile River (Chicopee River Basin)									
E.Brookfield(T), Mass.									
-Textile Mill	Q2	Textile,etc.	Organic	None	-	-	N	Undet'd.	Inactive
Chicopee Brook (Chicopee River Basin)									
Monson(T),Mass.									
-Woolen Mill	Q4	Textile,etc.	Organic	None	-	-	N	New plant	Undet'd.
-Laundry	Q4	Miscellaneous	Organic	None	-	-	N	Connection to Municipal System	Final 1/ plans approved
-Toilet Seats	Q4	Lumber,etc.	Undet'd.	None	-	-	N	"	"

1/ Plans for sewerage and sewage treatment for Monson Town

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Ware River (Chicopee River Basin)									
South Barre, Mass. (Barre T) -Wool Combing	C28.5	Textile, etc.	Organic	Intermediate	Undet'd.	Undet'd.	N	Undet'd.[1]	Undet'd.
Wheelwright, Mass. (Hardwick T) -Facial Tissues	C24.5	Paper, etc.	Organic	None	-	-	N	New plant	Inactive
Ware (T), Mass. -Undet'd.	C12.5	Undet'd.	Undet'd.	None	-	-	N	Connection to Municipal Sewers	Inactive[2]
Prince River (Chicopee River Basin)									
Barre (T), Mass. -Drill & Tapping Machines	W4	Machinery, etc.	Undet'd.	None	-	-	N	"	Inactive

1/ Project for additions to existing plant completed in March 1951, adequacy undetermined

2/ Dependent on action taken by Ware Town

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Westfield River (Main Stem)									
Becket Town Bancroft Village -Cleansing Tissue	C37.5	Paper, etc.	Organic	Primary	Unsat.	Sat.	1,700	Additional save-alls	Active planning
Chester(T), Mass. -Abrasives	C31.5	Miscellaneous	San. Sewage	None	-	-	33E	Connection to Municipal System	Active-Planning
Huntington(T), Mass. -Woolen Mill	C26	Textile, etc.	Organic	None	-	-	1,600	"	"
Russell(T), Mass. -Paper Board -Paper Mill	C21.5 C21.5	Paper, etc. Paper, etc.	Organic Organic	None Minor	- Unsat.	- Sat.	1,173 189	New plant Connection to Municipal System	" "
Woronoco, Mass. (Russell T) -Paper Mill	C19	Paper, etc.	Organic	None	-	-	16,375	New plant	"

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy				
					Cap'y.	Opr.			
Westfield River (Main Stem)									
W.Springfield(T), Mass.									
-Paper Mill	C3.5	Paper, etc.	Organic	None	-	-	N	Connection to Municipal Sewers	Final plans approved
-Paper Mill	C3.5	Paper, etc.	Organic	None	-	-	N	"	"
Westfield Little River (Westfield River Basin)									
Westfield(C), Mass.									
-Paper Mill	W4	Paper, etc.	Organic	None	-	-	N	"	"
-Thread Mill	W4	Textile, etc.	Organic	None	-	-	N	"	"
-Textile Machines	W4	Machinery, etc.	Undet'd.	None	-	-	N	"	"
-Bicycles	W4	Miscellaneous	Inorganic	None	-	-	N	"	"
Scantic River (Main Stem)									
Somersville, Conn. (Somers T)									
-Somersville Mfg. Co.	C18	Textile, etc.	Organic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Scantic River (Main Stem)									
Scitico, Conn. (Enfield T) -Gordon Brothers Co., Inc.	C16	Textile, etc.	San. Sewage	None	-	-	N	New plant	Undet'd.
Broad Brook (Scantic River Basin)									
Broad Brook, Conn. (E. Windsor T) -Broad Brook Co.	S1	Textile, etc.	Organic	None	-	-	N	New plant	Undet'd.
Farmington River (Main Stem)									
Collinsville, Conn. (Canton T)									
-Hurley Mfg. Co.	C43.5	Fabricated, etc.	San. Sewage	None	-	-	12E	New plant	Undet'd.
-Collins Co.	C43.5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Opr.			
Farmington River (Main Stem)									
Unionville, Conn. (Farmington T)									
-LaPointe Plasco-Mold Corp.	C37.5	Miscellaneous	San. Sewage	Primary	Un-det'd.	Un-det'd.	N	Addition	Undet'd.
-Pioneer Steel Ball Bearing Co.	C37.5	Machinery, etc.	San. Sewage	None	-	-	N	New Plant	Undet'd.
-Hartford Spinning Co., Inc.	C37.5	Textile, etc.	Organic	None	-	-	N	New Plant	Undet'd.
-Myrtle Knitting Mills	C37.5	Textile, etc.	Organic	None	-	-	N	New Plant	Undet'd.
-Charles W. House & Sons, Inc.	C37.5	Textile, etc.	Organic	None	-	-	N	New Plant	Undet'd.
-Sailing Mfg. Co.	C37.5	Machinery, etc.	San. Sewage	Primary	Un-det'd.	Un-det'd.	N	Additions	Undet'd.
-New England Spring Mfg. Co., Inc.	C37.5	Fabricated, etc.	San. Sewage	Primary	Un-det'd.	Un-det'd.	N	Additions	Undet'd.
Simsbury (T), Conn.									
-Ensign Bickford Co.	C20	Miscellaneous	Inorganic	None	-	-	N	New Plant	Undet'd.
Rainbow, Conn. (Windsor T)									
-Stevens Paper Mill, Inc.	C10	Paper, etc.	Organic	None	-	-	N	New Plant	Inactive

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Still River (Farmington River Basin)									
Winsted(C),Conn.									
-Gilbert Clock Corp.	WBF 6	Miscellaneous	Organic & Inorganic	None	-	-	N	New plant	Undet'd.
-Fairchilds Screw Products	WBF 6	Fabricated,etc.	San.Sewage	None	-	-	6	New plant	Undet'd.
-Winsted Mfg.Co.	WBF 6	Primary,etc.	San.Sewage	None	-	-	8	New plant	Undet'd.
-Winsted Hosiery Co.	WBF 6	Textile,etc.	Organic	None	-	-	N	New plant	Undet'd.
Mad River (Farmington River Basin)									
Winsted(C),Conn.									
-Capitol Products Co.,Inc.	S 1.5	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
-Edward F. Hickey's Sons, Inc.	S 1.5	Textile,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Hudson Wire Co.	S 1.5	Miscellaneous	San.Sewage	None	-	-	50	New plant	Undet'd.
-Dano Electric Co.	S 1.5	Miscellaneous	San.Sewage	None	-	-	47	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy				
					Cap'y.	Opr.			
Mad River (Farmington River Basin)									
Winsted(C),Conn.									
-Maderite Paper Box Co.	S 1.5	Paper,etc.	San.Sewage	None	-	-	5	New plant	Undet'd.
-H. Baker of Conn.	S 1.5	Fabricated, etc.	San.Sewage	None	-	-	8	New plant	Undet'd.
-Winsted Co.	S 1.5	"	Inorganic	None	-	-	N	New plant	Undet'd.
-Keratene Co. (Two Plants)	S 1.5	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
-Mason Silk Co.	S 1.5	Textile,etc.	Organic	None	-	-	N	New plant	Undet'd.
-New England Knitting Co.	S 1.5	Textile,etc.	Organic	None	-	-	N	New plant	Undet'd.
-Sterling Name Tape Co.	S 1.5	Miscellaneous	San.Sewage	None	-	-	N	New plant	Undet'd.
Manufacturers Stream (Farmington River Basin)									
Winsted(C),Conn.									
-Winsted Hardware Co.	M 1	Miscellaneous	Inorganic	None	-	-	N	New plant	Un det'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution-Abatement Needs	Current Status Industrial Action
Manufacturers Stream (Farmington River Basin)									
Winsted(C), Conn. (Continued)									
-Union Pin Co.	M1	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Jewell Products, Inc.	M1	Furniture, etc.	San. Sewage	None	-	-	8	New plant	Undet'd.
-Son Chief Electric Co., Inc.	M1	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
-Winsted Edge Tool Co.	M1	Fabricated, etc.	San. Sewage	None	-	-	15	New plant	Undet'd.
Poquabuck River (Farmington River Basin)									
Plainville(T), Conn.									
-H.L. Baum & Co.	F5.5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Yeomans Plating Corp.	F5.5	Fabricated, etc.	Inorganic	Secondary	Sat.	Sat.	N	None	
-M.H. Sullivan Foundry	F5.5	Primary, etc.	San. Sewage	None	-	-	5	New plant	Undet'd.
-Plainville Electro-Plating Co.	F5.5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Pequabuck River (Farmington River Basin)									
Plainville(T),Conn. (Continued)									
-Bristol Screw Co.	F 5.5	Fabricated,etc.	San.Sewage	Primary	Sat.	Sat.	N	None	
-Bristol Spring Co.	F 5.5	Fabricated,etc.	San.Sewage	None	-	-	3	New plant	Undet'd.
Park River (Main Stem)									
Hartford(C),Conn.									
-Whitlock Mfg. Co.	C 2	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Underwood Elliott Fisher Co.	C 2	Machinery,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Holo-Kroma Screw Corp.	C 2	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Jacobs Mfg. Co.	C 2	Machinery,etc.	Inorganic	Primary	Sat.	Sat.	N	None	
Piper Brook (Park River Basin)									
New Britain(C),Conn.									
-Launders,Frary & Clark (Main Plant)	SBP 5	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Piper Brook (Park River Basin)									
New Britain (C), Conn. (Continued)									
-P. & F. Corbin	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Corbin Screw Division	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Fafnir Bearing Co. (All Plants)	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-New Britain Machine Co. (Main Plant)	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-North & Judd Mfg. Co.	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Russell & Erwin Mfg. Co.	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Stanley Rule & Level Co.	SBP5	Fabricated, etc.	Inorganic	None	-	-	N	New plant	Undet'd.
Hockanum River (Main Stem)									
Talcottville, Conn. (Vernon T)									
-Aldon Spinning Mills	C14	Textile, etc.	San. Sewage	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
					Cap'y.	Opr.			
Hockanum River (Main Stem)									
Manchester(T), Conn.									
-Old Colony Co.	C11	Furniture, etc.	San. Sewage	Primary	Unsat.	Sat.	N	Additions	Undet'd.
East Hartford(T), Conn.									
-Case Brothers, Inc.(Factory #2)	C6.5	Paper, etc.	Organic	None	-	-	N	New plant	Active planning
-Sanitary Paper Mills, Inc.	C6.5	Paper, etc.	Organic	None	-	-	N	New plant	Inactive
-Burnside Co.	C6.5	Paper, etc.	Organic	None	-	-	N	New plant	Undet'd.
Lydall Brook (Hockanum River Basin)									
Manchester (T), Conn.									
-Lydall & Foulds Paper Co.	H1	Paper, etc.	Organic	None	-	-	N	New plant	Under Construction
-Colonial Board Co.	H1	Paper, etc.	Organic	None	-	-	N	New plant	"
-Rogers Bros.	H1	Chemical, etc.	Organic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Hop Brook (Hockanum River Basin)									
Manchester(T),Conn. -Case Brothers, Inc.(Factory #1)	H2.5	Paper,etc.	Organic	None	-	-	N	New plant	Active planning
Willow Brook (Hockanum River Basin)									
E.Hartford(T),Conn. -Silver Lane Pickle Co.	H0.7	Food,etc.	Organic	None	-	-	N	New plant	Undet'd.
-United Aircraft Corp.	H0.7	Miscellaneous	Inorganic	None	-	-	N	New plant	Under Construction
Pewterpot Brook (Keeney Cover)									
E.Hartford(T),Conn. -Lombardo Brothers	C4	Food,etc.	Organic	Secondary	Sat.	Sat.	N	None 1/	

1/ Add seepage system to sanitary sewage waste disposal plant

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Salmon Brook (Keeney Cove)									
Glastonbury(T), Conn.									
-Crescent Tool and Design	0 1	Miscellaneous	San.Sewage	None	-	-	7	New plant	Undet'd.
-New England Play Pen Co.	C 1	Furniture,etc.	San.Sewage	None	-	-	2	New plant	Undet'd.
-Airflo Instrument Co.	C 1	Miscellaneous	San.Sewage	None	-	-	2	New plant	Undet'd.
-Nutmeg Tool Co.	C 1	Fabricated,etc.	San.Sewage	None	-	-	1	New plant	Undet'd.
-Firetex System Inc.	C 1	Miscellaneous	Organic	None	-	-	N	New plant	Undet'd.
Hubbard Brook (Main Stem)									
Glastonbury(T), Conn.									
-Herman Roser & Sons,Inc.	C 3	Leather,etc.	Organic	Secondary	Sat.	Sat.	N	None	
-J.B. Williams Co.	C 3	Chemicals,etc.	Organic	Primary	Sat.	Sat.	N	None	

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Adequacy Opr.			
Roaring Brook (Main Stem)									
E.Glastonbury,Conn. (Glastonbury T) -Peerless Woodworking Shop	C 6	Furniture,etc.	San.Sewage	Secondary	Sat.	Sat.	N	None	
S.Glastonbury,Conn. (Glastonbury T) -Matson Mills,Inc.	C 2	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
Mattabossett River (Main Stem)									
New Britain(C),Conn. -Landers,Frary & Clark(B&K Plant)	C 11	Miscellaneous	Inorganic	None	-	-	N	Connection to Municipal System	Undet'd.
-Landers,Frary & Clark(Range Div.)	C 11	Miscellaneous	Inorganic	None	-	-	N	"	Undet'd.
-New Britain Gas & Light Co.	C 11	Miscellaneous	Organic	Primary	Sat.	Sat.	N	None	
-Corbin Cabinet Lock Co.	C 11	Fabricated,etc.	None	None	-	-	N	Connection to Municipal System	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy		P.E. (B.O.D.) Disch'd. to Watercourse	Pollution-Abatement Needs	Current Status Industrial Action
					Cap'y	Opr.			
Mattabessett River (Main Stem)									
-New Britain Machine Co.	C 11	Fabricated, etc.	Inorganic	None	-	-	N	Connection to Municipal System	Undet'd.
-Tuttle & Bailey, Inc.	C 11	Fabricated, etc.	Inorganic	None	-	-	N	"	Undet'd.
Kensington, Conn. (Berlin T)									
-Ferndale Dairy	C 11	Food, etc.	Organic	None	-	-	N	New plant	Undet'd.
Berlin(T), Conn.									
-Lower Lane Dairy	C 9	Food, etc.	Organic	None	-	-	N	New plant	Undet'd.
-Johnson's Dairy	C 9	Food, etc.	Organic	None	-	-	N	New plant	Undet'd.
-Ventres Dairy	C 9	Food, etc.	Organic	None	-	-	N	New plant	Undet'd.
-Stanley Chemical Co.	C 9	Chemicals, etc.	Organic	None	-	-	N	New plant	Undet'd.
Coginchaug River (Mattabessett River Basin) Middletown(C), Conn.									
-Rock Fall Textile Printing Corp.	M 2.5	Textile, etc.	Organic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution-Abatement Needs	Current Status Industrial Action
Sumner Brook (Main Stem)									
Middletown(C),Conn.									
-Russell Mfg. Co.	C1.5	Textile,etc.	Organic	None	-	-	N	New plant	Inactive
Candlewood Hill Brook (Main Stem)									
Higganum, Conn. (Haddam T)									
-Orkic, Inc.	C1	Fabricated,etc.	San.Sewage	Primary	Unsat.	Sat.	N	Additions	Undet'd.
-Frismar,Inc.	C1	Paper,etc.	Organic	None	-	-	N	New plant	Undet'd.
-Frissell Fabric Co.	C1	Textile,etc.	Organic	None	-	-	N	New plant	Undet'd.
Salmon River (Main Stem)									
North Westchester,Conn. (Colchester T)									
-C.H. Norton Co.	C12	Paper,etc.	Organic	Primary	Sat.	Sat.	N	None	
Pocotopaug Creek (Salmon River Basin)									
East Hampton(T),Conn.									
-Artistic Wire Products Co., Inc.	P4.5	Primary,etc.	Inorganic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
Pocotopaug Creek (Salmon River Basin)									
East Hampton(T),Conn. (Continued)									
-Starr Brothers Bell Co.	P4.5	Miscellaneous	San.Sewage	None	-	-	N	New plant	Undet'd.
-Johnson Electro-plating Works	P4.5	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-N.N. Hill Brass Co.	P4.5	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
-Bevin Wilcox Line Co.	P4.5	Miscellaneous	San.Sewage	None	-	-	N	New plant	Undet'd.
-Bevin Brothers Mfg. Co.	P4.5	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
-Gong Bell Mfg. Co.	P4.5	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
Moodus River (Salmon River Basin)									
Moodus,Conn. (E.Haddam T)									
-Lloyd E. Cone Thread Co.	S2	Textile,etc.	San.Sewage	None	-	-	N	New plant	Undet'd.
-Brownell Co.,Inc. (Upper Mill)	S2	Textile,etc.	San.Sewage	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Adequacy Opr.			
Moodus River (Salmon River Basin)									
Moodus, Conn. (E. Haddam T) (Continued)									
-Brownell & Co., Inc. (Lower Mill)	S 2	Textile, etc.	Organic	None	-	-	N	New plant	Undet'd.
-Moodus Net & Twine, Inc.	S 2	Miscellaneous	San. Sewage	None	-	-	N	New plant	Undet'd.
-Machine Design Shop	S 2	Machinery, etc.	San. Sewage	None	-	-	N	New plant	Undet'd.
-W.E. Nichols Garage	S 2	Miscellaneous	Organic	None	-	-	N	New plant	Undet'd.
-Neptune Twine & Cord Mills	S 2	Miscellaneous	San. Sewage	None	-	-	N	New plant	Undet'd.
Succor Brook (Main Stem)									
E. Haddam (T), Conn.									
-Walter A. McCabe Co.	C 1	Paper, etc.	San. Sewage	None	-	-		New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'y.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution-Abatement Needs	Current Status Industrial Action
Pattaconck Creek (Main Stem)									
Chester(T),Conn.									
-Russell Jennings Mfg. Co.	C2.5	Fabricated,etc.	Inorganic	Minor	Unsat.	Sat.	N	Additions	Undet'd.
-Bishop & Watrous	C2.5	Miscellaneous	San.Sewage	None	-	-	N	New plant	Undet'd.
-Chester Sanitary Laundry	C2.5	Miscellaneous	Organic	None	-	-	N	New plant	Undet'd.
Great Brook (Pattaconck Creek Basin)									
Chester(T),Conn.									
-E. W. Douse Co.	P1.5	Fabricated,etc.	San.Sewage	Primary	Unsat.	Sat.	4E	Enlargement of existing plant	Undet'd.
-M. S.Brooks & Sons	P1	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-C. J. Bates & Son	P1	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures: Degree	Adequacy Cap'l.	Adequacy Opr.	P.E. (B.O.D.) Disch'd. to Watercourse	Pollution Abatement Needs	Current Status Industrial Action
Deep River (Main Stem)									
Deep River(T),Conn. -Electric Soldering Iron Co.,Inc.	C2	Miscellaneous	San.Sewage	None	-	-	N	New plant	Undet'd.
-Brass Goods Mfg. Co.	C2	Primary,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
-Uarco	C2	Miscellaneous	San.Sewage	Secondary	Sat.	Sat.	0	None	
-Moore Mfg. Co.	C2	Miscellaneous	San.Sewage	None	-	-		New plant	Undet'd.
-Lovett Metal Products Co.	C2	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
-White Way Laundry	C2	Miscellaneous	Organic	None	-	-	N	New plant	Undet'd.
Falls River (Main Stem)									
Westbrook(T),Conn. -Deep River Mfg. Co.	C6	Fabricated,etc.	Inorganic	None	-	-	N	New plant	Undet'd.
Ivoryton, Conn. (Essex T) -Pratt, Read & Co. Inc.	C4	Miscellaneous	San.Sewage	Primary	Unsat.	Sat.	N	Additions	Undet'd.
-Ernst Bischoff Co.	C3.5	Chemicals,etc.	Organic	Primary	Un- det'd.	Un- det'd.	N	Additions	Undet'd.
-W. Whitney Stueck, Inc.	C3	Primary,etc.	San.Sewage	None	-	-	5 E	New plant	Undet'd.

Name and Location	River Mile Above Outlet Stream	Type Industry*	Type Waste Produced	Treatment or Other Pollution Control Measures:			P.E. (B.O.D.) Disch'd. to Water-course	Pollution Abatement Needs	Current Status Industrial Action
				Degree	Adequacy Cap'y.	Adequacy Opr.			
Falls River (Main Stem)									
Ivoryton, Conn. (Essex T) (Continued)									
-Behrens & Bushnell Co. Inc.	C 2.5	Miscellaneous	Organic	None	-	-	N	New plant	Undet'd.
-Conn. Valley Mfg. Co.	C 2	Fabricated, etc.	San. Sewage	Primary	Unsat.	Sat.	18E	Additions	Undet'd.
-R.W. Cramer Co. Inc.	C 1.5	Miscellaneous	Inorganic	None	-	-	N	New plant	Undet'd.
Mud River (Falls River Basin)									
Essex(T), Conn.									
-Verplex Co.	F 0.5	Fabricated, etc.	Inorganic	None 1/	-	-	N	New plant	Undet'd.
-E.E. Dickinson	F 0.5	Chemicals, etc.	Organic	Dilution	Sat.	Sat.	N	None	
Unnamed Brook (Main Stem)									
Old Saybrook(T) Conn.									
-John Magee Co.	C 1	Food, etc.	Organic	Primary	Unsat.	Sat.	N	Addition	Undet'd.

1/ Dilution Satisfactory at present

FOOT NOTES

**	Industries having separate outlets and discharging wastes directly to watercourse.
*	List of Industries Food and kindred products Textile mill products Lumber and wood products (except furniture) Furniture and fixtures Paper and allied products Chemicals and allied products Products of petroleum and coal Rubber products Leather and leather products Primary metal industries Fabricated metal products (except ordnance, machinery, and transportation equipment) Machinery (except electrical) Miscellaneous manufacturing industries
N	Information not available or undetermined
E	Estimated population equivalent figures

APPENDIX "C"

Summary of Water Pollution Control Laws and Interstate Legislation in Effect in the Connecticut River Basin, 1950

Vermont Water Conservation Board

Under Title 29, "Conservation and Development of Natural Resources," Chapter 276 of the Vermont Laws created the State Water Conservation Board. Section 6299 declares the policy of the State in water conservation which is declared to be "....that the water resources of the state shall be protected, regulated and, where necessary, controlled under authority of the state in the public interest and to promote the general welfare..." Section 6301 creates the Board which consists of three members appointed biennially in the month of February by the Governor. Section 6302 directs that the Board shall keep suitable permanent records and may, with approval of the Governor, employ a Commissioner of Water Resources who shall be the Executive Secretary of the Board and such other persons as necessary to carry out the intent of the law. Section 6303 defines the duties of the Board and those most closely pertaining to stream pollution give the Board supervision of the water resources of the State except for the powers and duties of the State Board of Health, local health authorities and the Public Service Commission respecting hydroelectric power development. The Board is required to study and investigate the streams in the State and to cooperate with appropriate Federal agencies, adjoining States and States through which Vermont streams flow and with the Board of Health. The Board is directed to encourage the construction of pollution abatement measures and to encourage recreational uses of the waters.

Chapter 277 relates to the control of pollution of waters and the enforcement of the provisions contained therein is delegated to the Water Conservation Board. Section 6305 prohibits the pollution of waters of the State and directs that "No person shall create, establish, cause or maintain any source of pollution existing on or before June 1, 1949, or increase any source of pollution existing on or before such date except through petition to the board and upon receipt from the board of written authorization so to do." Section 6306 relates to hearings and any member of the Board may require a person causing or alleged to be causing pollution of any waters, contrary to provisions of Chapter 277, to appear before the Board to show cause why orders restraining such pollution should not be issued. Section 6307 pertains to orders and states that the Board "....may make an order directing such person to use or to operate some practicable and reasonably available system or means which will reduce, control or eliminate such pollution having regard for the rights and interests of the general public, provided the cost of installation, maintenance and operation thereof shall not be unreasonable or inequitable." Section 6308 gives a person the right to request of the Board changes in systems ordered to be used or operated. The enforcement features of the law are contained in Section 6309 which states "The board may cause the enforcement of any order issued by it to reduce, control, or eliminate pollution of any water by suit in equity brought before the chancery court of the county wherein such pollution shall have been found by the board to have originated. The suit shall be brought by the attorney general in the name of the state, and shall enjoin a person from continuing such pollution." Under Sections 4 through 10 of Act #148 of 1949, classifications of waters are defined and alterations thereof. The Board may call on any other State department or agency for aid and may hold public hearings in the interests of classification of waters. Appeals may be made on classifications of waters established by the Board and petitions to create, establish or increase sources of pollution may be made to the Board. Any person who violates the provisions of Chapter 277, or an order of the Board, shall be fined not more than $50 for each day of violation provided the total fine shall not exceed $1,000.00. Persons aggrieved by any order of the Board have the right of appeal.

Massachusetts Department of Public Health

The greater part of Massachusetts authority to control pollution is vested in Chapter 615, titled, "An Act Extending the Authority of the Department of Public Health to Regulate Pollution of Inland and Tidal Waters." This chapter was approved July 17, 1945, and became law on amendment of Section 5 of Chapter 111 of the General Laws by striking out the paragraph inserted by Chapter 338 of the Acts of 1941.

The essential features of this law give the State Department of Public Health the power to prescribe and establish rules and regulations to prevent pollution or contamination in any or all of the surface waters within the Commonwealth. The Public Health Council, acting under the authority of Section 5, Chapter 111 of the General Laws, as amended by Chapter 615 of the Acts of 1945, adopted rules and regulations to prevent pollution or contamination of any or all of its surface waters. These regulations provide that no sewage, human excrement, garbage, manure, or other putrescible matter, no manufacturing refuse or waste product and no refuse or waste product or polluting liquid shall be discharged or put into any surface water within the Commonwealth except as may be approved by the Department of Public Health. The rules and regulations were approved by the Governor and Council September 19, 1945, and as established have the force of law.

New Hampshire Water Pollution Commission

Chapter 166A, revised laws as inserted by Chapter 183, Laws of 1947 of New Hampshire, creates the New Hampshire Water Pollution Commission and generally grants to the Commission statutory power to control pollution. The State Board of Health, however, is granted some powers relating to ice and water supply as well as certain powers concerning sewerage systems and sewage treatment plants.

The New Hampshire Water Pollution Commission consists of the following members: a Chairman, the State Health Officer, the Director of the Fish and Game Department, the Director of the Division of Recreation of the Forestry and Recreation Department, the Director of the Planning and Development Commission, one of the Commissioners of the Public Service Commission, the Chairman of the Water Resources Board, two members representing industrial interests in the State, and one member representing a municipal or private water works of the State. The Director of the Division of Sanitary Engineering of the State Health Department shall be the Technical Secretary of the Commission. The Technical Secretary, under the direction of the Commission, administers the provisions of the law.

Development of Comprehensive Programs.

The Commission is directed by law to classify the waters of the State. Five classifications are specified: Class A, B1, B2, C, and D. Class A, the highest classification, shall be considered as water acceptable for use as public water supply after disinfection. Class D, the lowest classification, shall be considered as being devoted primarily for the carrying of sewage and industrial waste without nuisance. Each of the classifications lists the permissible physical, chemical, bacteriological, and biological conditions.

The procedure for classification is as follows:

a. Prior notification for hearing.

b. Holding of hearing.

c. Review of the evidence and data presented at the hearing, made by at least five members of the Commission, after which the Commission recommends to the legislature the classifications of the waters under consideration.

d. Adoption of classifications by the legislature.

The statute declares that all natural fresh water ponds having an area of 20 acres or more shall be classified as B1 which are to be waters protected for recreational bathing. It appears that this provision also applies to fresh water ponds of more than 10 acres which constitute public waters of the State.

The Commission is directed to require the filing of all plans and specifications relating to the installation of systems and devices for handling, treatment or disposing of sewage or waste with the Commission at least 30 days prior to the beginning of construction of such installation.

The Commission has the power to enforce an adopted classification by appropriate action in the courts of the State. However, before an order is issued, the Commission generally holds an informal hearing with the persons responsible for the discharge of such sewage or waste and advises the person that the Commission proposes to issue such an order. The order fixes a time limit within which the action must be taken. However, if such pollution is of municipal or industrial origin, such limit for abatement shall be not less than two nor more than five years provided, however, that for good cause shown the Commission may extend the time limitation.

A fine of $1,000 may be levied against any person for each day which he has violated, neglected or refused to obey an order of the Commission.

Within 20 days after the order a party to the action before the Commission or a person affected thereby may apply for a rehearing specifying in the motion the grounds therefor. The Commission may grant a rehearing if, in its opinion, a good reason is set forth in the motion. The Commission must either grant or deny the motion within ten days. Within 30 days after a denial of the motion or within 30 days after the decision of a rehearing, the appellant may appeal by petition to the Supreme Court. The burden is upon the party appellant to show that the order is clearly unreasonable or unlawful and all findings of fact properly before the court shall be considered prima facie lawful and reasonable.

The Commission is directed to study and investigate all problems in connection with the surface waters of the State and to conduct experiments, investigations and research to determine economical and practicable means for the elimination, disposal or treatment of industrial wastes and to cooperate with public and private agencies in the conduct of experiments, investigations and research.

The Commission has the duty of approving all applications for State or Federal aid which may be made available in the interests of pollution control. The Commission is designated the State agency to receive and to make agreements on behalf of the State for any Federal funds or other monies which may be allotted for pollution control. The Commission is likewise named as the agency to carry out interstate agreements or compacts pertaining to pollution.

The Commission is directed to hold hearings prior to classification of a stream. Furthermore, it holds hearings prior to issuing orders concerning a violation of the classification.

There is no geographical exemption as such. Although waters that constitute ice and water supplies appear to be within the jurisdiction of the State Board of Health, the Commission appears to have concurrent jurisdiction. Some existing sources of water supply have been classified.

Connecticut State Water Commission

Chapter 195 of the General Statutes of Connecticut relates to water pollution control. It vests the enforcement of the provisions contained therein in the State Water Commission which is an independent commission comprised of three members appointed by the Governor with the advice and consent of the Senate. The members of the Commission choose one of their number as chairman.

The Commission derives authority to develop pollution abatement programs from the public prefaces of the statute and, particularly, from its power to order a person to operate some practical method of eliminating or reducing pollution, "...having regard for the rights and interests of all persons concerned." In addition to the authority to issue orders the Commission also has the authority to review and approve construction plans and specifications, whether these plans are for new construction or for any substantial change to be made in an existing system. Section 4045 prohibits establishing new sources of pollution and provides that the Commission may, upon application by a new source of pollution, order treatment, disposal or otherwise in the best interest of the people.

The enforcement features of the Connecticut law are contained in Section 4043, titled, "Order Concerning Elimination of Pollution." This section provides that, after a hearing before the Commission, the Commission may order a person found to be polluting the waters to reduce, control or eliminate such pollution by some practical and reasonably available system, "....having regard for the rights and interests of all persons concerned provided the cost of installation, maintenance and operation thereof shall not be unreasonable or inequitable." Persons, firms or corporations so ordered have the right to appeal to the Commission within 30 days of receipt of orders. When an order is issued, it must specify the system to be used or give a choice of systems if more than one is practical and available, and must specify the time within which the system shall be in operation. Orders to reduce, eliminate, or regulate pollution may be enforced by the Commission through a proceeding conducted by the Attorney General whereby an injunction or, in the case of a municipality, appropriate process is sought from the Superior Court, or a judge thereof, if the Court is not in session.

In its functions with other public and private agencies, the law specifies that the Commission may cooperate with any public or private agency in carrying out the work under the law. Under this authority, as well as under the authority granted in the special enabling acts, the executive director is a member of the Interstate Sanitation Commission created by interstate compact with New Jersey and New York and is also a member of the New England Interstate Water Pollution Control Commission created by a compact with Massachusetts, Rhode Island and New York.

Connecticut State Department of Health

There are a number of Chapters, and Sections thereof, in the Public Statutes of Connecticut which vest authority in the Department of Health to prevent, control, and abate water pollution. All of the Chapters relating to water pollution have enforcement and/or penalty clauses and the jurisdictions, procedures and rights of appeal authorized are well defined. The Chapters of the Public Statutes which are directed most specifically towards water pollution are summarized below.

Chapter 194 relates to the disposal of sewage and specifies in Section 4034 that "No person, corporation or municipality shall place in or permit to be placed in, or discharge or permit to flow into, any of the waters of the State, any sewage prejudicial to public health." The State Health Department is authorized to inspect all sources of sewage discharge and existing or proposed sewerage systems and treatment works and to require their operation in a manner protective of the best interests relating to the public health. To this end, the Department may order their alteration, extension, and replacement when necessary and has the authority to approve the qualifications of sewage plant operators. Section 4036 of Chapter 194 authorizes the Department to investigate complaints of sewage pollution and to issue orders to prevent continuation of sewage pollution.

Chapter 200 contains the General Provisions of the Public Statutes relating to water pollution. Section 4186 provides for the inspection and regulations concerning shell fish with authority vested in the State Health Department. It may prescribe regulations for the sanitary growth, production and preparation of shell fish for market. Said Department is authorized to issue certificates to commercial shell fish interests without which shipments of shell fish cannot be made. The Department's power to revoke certificates allows it to regulate the sanitary quality of shell fish marketed. Section 4188 empowers the Department to prohibit the harvesting of shell fish in contaminated areas and Section 4189 permits it to promulgate coastal waters and flats shown to be contaminated or polluted.

Chapter 242 relates to pollution of harbors and rivers. Section 4762 prohibits the throwing of refuse into the waters of any harbor or river in the State from any steamer or vessel. Section 4766 prohibits the disposition of any substance except oyster shells into certain waters along the shoreline.

Chapter 201 regulates nuisances and Sections 4201, 4202, and 4205 prohibit the maintenance of nuisances by obstruction of watercourses, disposition of rubbish in streams, or creation of nuisances by filthy waters.

Chapter 193 relates to pollution of water and ice. Section 4011 prohibits the pollution of any waters which serve as the source of ice, the permit for the taking of which has been granted. Section 4015 gives the State Health Department "....jurisdiction over all matters concerning the purity of any source of water or ice supply used by a municipality, public institution or water or ice company for obtaining water or ice." It authorizes the Department to approve the qualifications of water plant operators. Section 4016 authorizes the State Health Department to approve the construction plans of water systems for any municipality, corporation or individual. Section 4017 allows the Department to investigate any source of water or ice or water supply system and, when necessary, issue such orders as necessary to protect and render the water and ice safe for domestic use. Section 4023 authorizes the Department to make analyses of water and establish requirements for other water and sewage laboratories.

There are other Public Statutes, not necessarily administered by the State Department of Health, which regulate pollution of waters of the State. Broader interpretation of some of the provisions of the Statutes permits a wider scope of authority in water pollution prevention, control and abatement by the State Health Department than shown in the summary above.

New England Interstate Water Pollution Control Commission

Because the Connecticut River is an interstate stream lying within the borders of the States of Massachusetts, Connecticut, Vermont and New Hampshire, and the first two States being signatory to the compact, the New England Interstate Water Pollution Control Commission has certain jurisdiction in controlling pollution of this stream.

On March 29, 1951, the Governor of Vermont signed the Act enabling that State to join the compact, the effective date to be June 1, 1951. The State of New Hampshire entered into the compact on July 30, 1951, when the Governor signed into law the enabling legislation and which date this legislation became effective.

As members, each of the signatory States pledges to provide for the abatement of existing pollution and for the control of future pollution of interstate inland and tidal waters and to put and maintain the waters thereof in a satisfactory condition consistent with the highest classified use of each body of water.

Article IV contains an important function in that, "The Commission ...... shall make recommendations for any legislation deemed by it advisable, including amendments to the statutes of the signatory States which may be necessary to carry out the intent and purpose of this compact."

Article V of the compact requires the Commission to establish reasonable physical, chemical, and bacteriological standards for stream waters and to classify all interstate streams as to the desired water quality for future intended uses after classifications of said waters have been made by the States and submitted to the Commission for approval.

APPENDIX "D"

Digest of Proposed Connecticut River Flood Control Commission Compact

I. Principal Purposes of Compact

The principal purposes of this compact are: (a) to promote interstate comity among and between the signatory States; (b) to assure adequate storage capacity for impounding the waters of the Connecticut River and its tributaries for the protection of life and property from floods; (c) to provide a joint or common agency through which the signatory States may more effectively cooperate in accomplishing the object of flood control and water resources utilization in the Connecticut River Basin.

II. Administrative Organization

The Connecticut River Valley Flood Control Commission shall consist of twelve members, three from each of the States of Connecticut, Massachusetts, New Hampshire and Vermont. The members of the Commission shall be chosen by their respective States as determined by the enabling law of each State.

A majority of members from each State shall constitute a quorum and no action of the Commission shall be binding unless at least two members from each State shall vote in favor thereof.

The Commission shall elect from its members a chairman, vice chairman, clerk and treasurer.

III. Powers and Duties

The Commission shall constitute a body, both corporate and politic, with full power and authority (1) to sue and be sued; (2) to have a seal; (3) to appoint and employ agents and employees; (4) to enter into contracts and agreements; (5) to have additional powers and duties as may be imposed upon it by the legislature of any of the signatory States provided they are concurred in by the legislatures of the other signatory States and by Congress.

The Commission shall make, or cause to be made, such studies as it may deem necessary, in cooperation with the Corps of Engineers or other Federal agencies for the development of a comprehensive plan for flood control and for water resources utilization in the Connecticut River Valley.

IV. Agreement to Permit Construction of Specific Dams and Reservoirs

The signatory State wherein is located the site of each of the following dams and reservoirs agrees to the construction by the United

States of each such dam and reservoir in accordance with authorization by the Congress:

(A) In Massachusetts: (1) At Barre Falls on the Ware River.

(B) In Vermont: (1) At West Townshend on the West River; (2) At Ball Mountain on the West River; (3) At North Hartland on the Ottaquechee River; (4) At Groton Pond on the Wells River; (5) At Victory on the Moose River; (6) In Bloomfield on the Nulhegan River.

(C) In New Hampshire: (1) At South Keene on Otter Brook; (2) At Walpole on Cold River; (3) At Bethlehem junction on the Ammonoosuc River; (4) At Franconia on the Ammonoosuc River; (5) At Swift River on the Wild Ammonoosuc River.

V. Reimbursement for Taxes and Economic Losses

Massachusetts agrees to pay fifty percent and Connecticut agrees to pay forty percent to each of the States of New Hampshire and Vermont of the amount of taxes lost to political subdivisions as a result of the construction of flood control projects, either presently built, contemplated as agreed to as indicated in Section IV above, or herein after constructed. In addition, Connecticut agrees to pay Massachusetts forty percent of the amount of taxes lost as a result of the construction of flood control projects.

Annually the Commission shall determine the loss of taxes to political subdivisions of each signatory State by reason of acquisition and ownership therein by the United States of lands, rights or other property in connection with each flood control dam and reservoir.

Lump-sum payments for the above mentioned tax losses on any flood control project may be agreed to by the States concerned. The lump-sum payments would then be in lieu of annual payment.

Massachusetts and Connecticut each agrees to pay its respective share in reimbursement for economic losses and damages occuring by reason of ownership by the United States of any flood control dam and reservoir specified in Section IV above and also for any flood control dam and reservoir constructed hereafter by the United States in the Connecticut River Valley.

A signatory State may acquire title or option to any or all lands, etc., as may be required for any flood control dam and reservoir within its boundaries and transfer such titles and options to the United States. If the amount received from the United States for such title and options is less than the amount paid, the States of Connecticut and Massachusetts shall pay its share of such excess costs to said signatory State.

Whenever any flood control dam and reservoir shall be constructed, reconstructed, altered, or used for any additional purpose, reimbursement for loss of taxes or economic losses and damages shall be separately computed by the Commission. If the total losses are more than the value of the benefits from the other uses, the difference will be prorated to the other States for payment.

The signatory States agree that preference to purchase power generated in connection with any dam and reservoir constructed by the United States for both flood control and generation of power shall be exercised first by the signatory State wherein such dam and reservoir is located.

Effective Date of Compact

The compact shall become operative and effective when ratified by Massachusetts, New Hampshire, Vermont and Connecticut and approved by the Congress of the United States.